THE ARCHITECT & BUILDING NEWS

9 FEBRUARY 1956 · VOL 209 · NO. 6 · ONE SHILLING WEEKLY

• BLOOD STORAGE BUILDING BRENTWOOD

PUBLISHED IN LONDON SINCE 1854

Steelwork

A SINGLE JOIST
OR
A COMPLETE BUILDING

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STEELWORK
SERVICE

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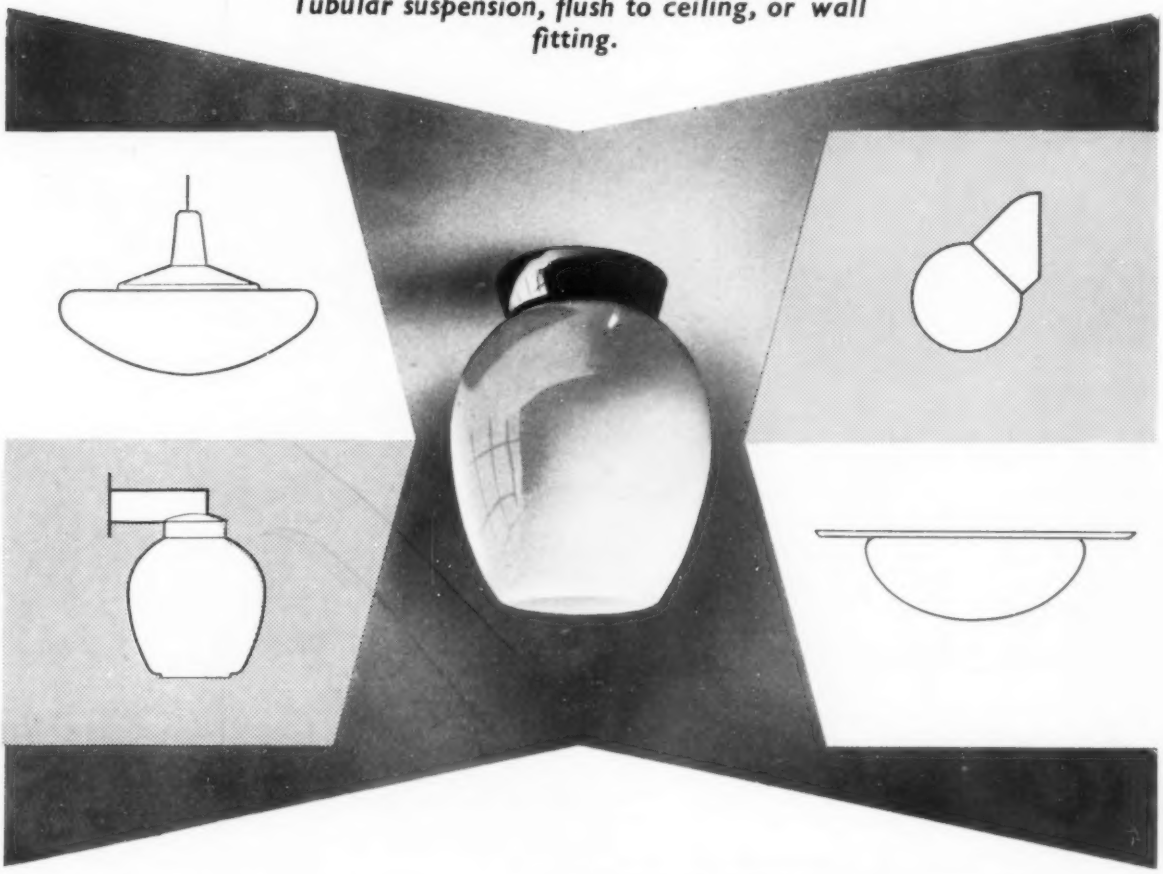
LTD
LEEDS

TELEPHONE 27301 (20 Lines)

TELEGRAMS "SECTIONS LEEDS"

general lighting

For efficient overall glare-free lighting. Utilizing British 3-ply flashed opal glassware. Tubular suspension, flush to ceiling, or wall fitting.



The Ultralux range is renowned for its simple functional design, which has contributed largely to Troughton & Young's reputation for lighting efficiency. It is part of the comprehensive range of lighting fittings which include Versalite for directional lighting, Mondolite for universal lighting, and Tubalux for fluorescent lighting — to be seen attractively displayed at

THE LIGHTING CENTRE.

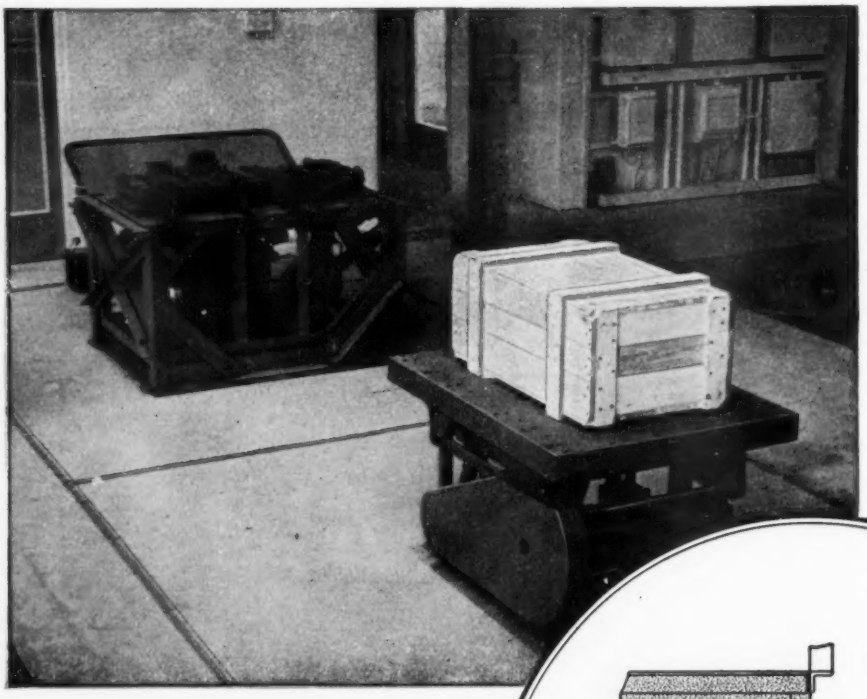
» ULTRALUX «

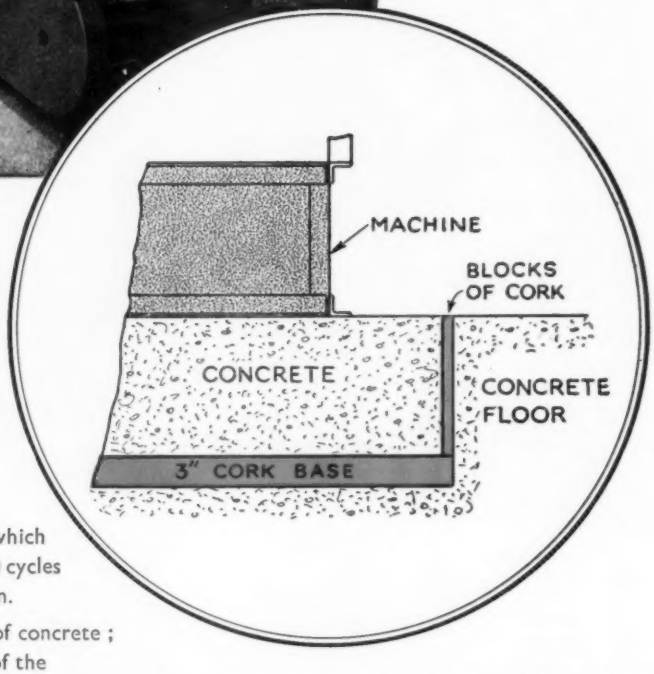
A range of lighting fittings by

TROUGHTON & YOUNG

TROUGHTON & YOUNG (Lighting) LTD., The Lighting Centre, 143 KNIGHTSBRIDGE, LONDON, S.W.1. 'Phone: KENsington 344. and at 46 Rodney Street, Liverpool 1.

A





Langite vibration insulation

at Research and Development Establishment of E.P.S. Ltd. at Sittingbourne

The illustration shows vibration-test equipment which can vibrate a 500 lb. case at frequencies up to 900 cycles a minute with an amplitude of plus and minus $\frac{1}{4}$ in.

The equipment is mounted upon a 15-ton block of concrete ; to prevent transmission of vibration to the rest of the building this block 'floats' in a setting of Langite cork pads ; a three-inch layer carries the whole weight, and thinner blocks provide lateral insulation.

Langite pads have been used extensively for 30 years under escalator and lift gear, fans, diesel engines, test beds, compressors, rotary printing presses, punch card tabulators, and other machinery.

Supplied to: Ministry of Supply, Ministry of Works, Air Ministry, Post Office, British Railways, London Transport, Central Electricity Authority, British Broadcasting Corporation, London County Council, etc.

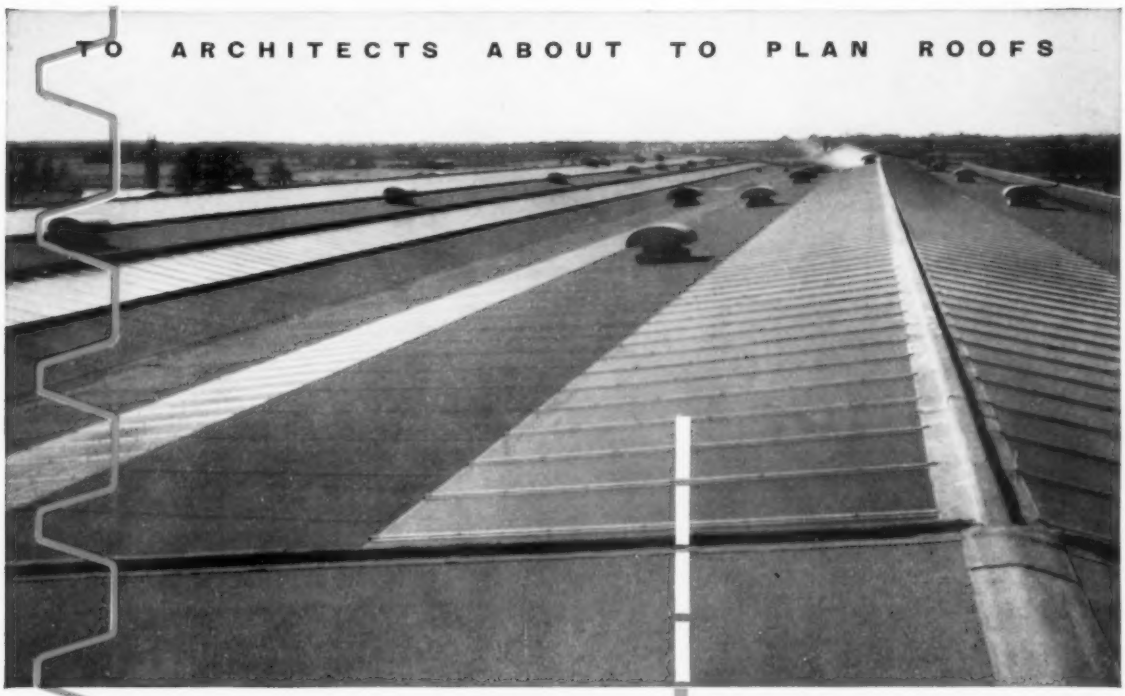
LANGITE

ANTI-VIBRATION PADS

CORK MANUFACTURING CO. LTD., SOUTH CHINGFORD, LONDON, E.4

TELEPHONE : SILVERTHORN 2666

TO ARCHITECTS ABOUT TO PLAN ROOFS



This roof is **DUST PROOF**

Where BRITVIC the well known fruit drink is manufactured by British Vitamin Products Ltd. near Chelmsford, it was essential for the roof to be sealed against dust, soot and grime. It had to be speedily erected, of high Thermal Insulation yet economical in cost. Bitumetal conformed to these requirements and in addition provided a clean and attractive reflective ceiling.

Our Area Managers at the undernoted centres can give you more interesting information regarding Bitumetal, especially the results of recent research into Interstitial Condensation and its cure.

9000 sq. yds. of "BITUMETAL" laid on Factory for British Vitamin Products Ltd., Nr. Chelmsford. Developed by C.A.S. (Industrial Developments) Ltd., Contractors—C.A.S. (Contractors) Ltd. Architects—Llewellyn Smith & Waters F/F.R.I.B.A.

BITUMETAL

★ ROOF *plus* CEILING *plus* INSULATION

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60 pages: Colour theory: Preparation and Application: Estimating: Specifications for all surfaces and finishes: Refillable Desk Diary.

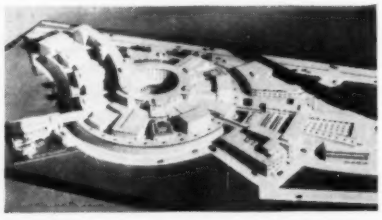
An essential Handbook, free to Architects

" Extremely interesting . . . information of great value . . . unique publication . . . very excellent production " . . . these are some of the comments that the SMITHSON " Handbook of Paints and Painting Practice " has inspired. It is indeed a very detailed and authoritative work on a highly important subject. Architects in the United Kingdom are cordially invited to write for a copy.

Our Technical and Colour Advisory Services are freely available.

Smithson

SMITHSON Paints have been largely used at the B.B.C. Television Centre at the White City.



makers of fine paints since 1790

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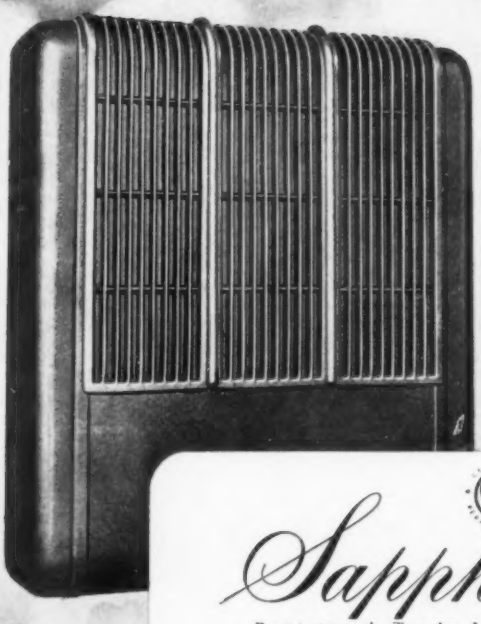
D/AB/2033

THE SPACE HEATER OF TOMORROW . . .



The Sapphire '20' Balanced Flue Gas Space Heater is the result of British scientific research and development in the field of gas utilization.
Here is the complete answer to modern requirements of maximum efficiency; warm, fresh air, free from products of combustion, *plus* the highest possible safety factor.

Sapphire "20"
Registered Trade Mark Fully Patented

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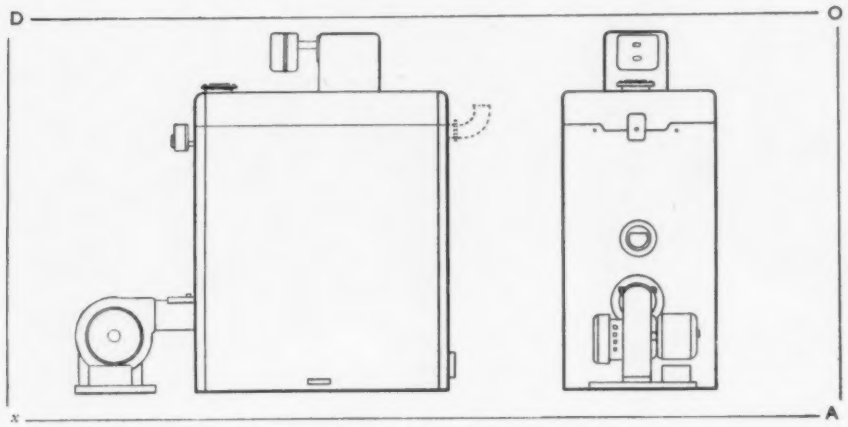
B

CENTRAL HEATING AND HOT WATER SUPPLY

THEOREM 1

That if oil is the fuel to be used for the supply of hot water for central heating and domestic purposes it is most economical to employ a Potterton Oil-Fired Boiler.



Given: A Potterton Oil-Fired Boiler D O A *x*.

Construction: Designed specifically for oil firing.

Required to Prove: That, given oil as the fuel, there is no more economical means of supplying hot water for central heating and domestic use.

Proof: The cost of any heating service is the sum of:

i. the cost of the appliance and its installation.
ii. the running costs.
iii. the cost of service and maintenance.

In the case of a Potterton Oil-Fired Boiler

i. it is supplied as a complete unit thus ensuring minimum fixing costs.
ii. it achieves a true working efficiency of 80% of the heat from the oil transferred to the water (the maximum efficiency that can be used in any boiler without the risk of condensation).
iii. it has fully automatic oil burners and controls, and requires very little maintenance.

∴ If oil is the fuel to be used for the supply of hot water for central heating and domestic purposes it is most economical to employ a Potterton Oil-Fired Boiler.

Q.E.D.

Rider: The output of any DOA series Boiler is given by:—

B.Th.U. hr = 36000 *x*

where *x* = number of sections and can have integral values of from 3 to 8.

We will be very pleased to elaborate on this theorem if you will write to Thomas De La Rue & Co. Ltd., 20/30 Buckhold Road, Wandsworth, S.W.18.

POTTERTON OIL-FIRED BOILERS MADE BY DE LA RUE

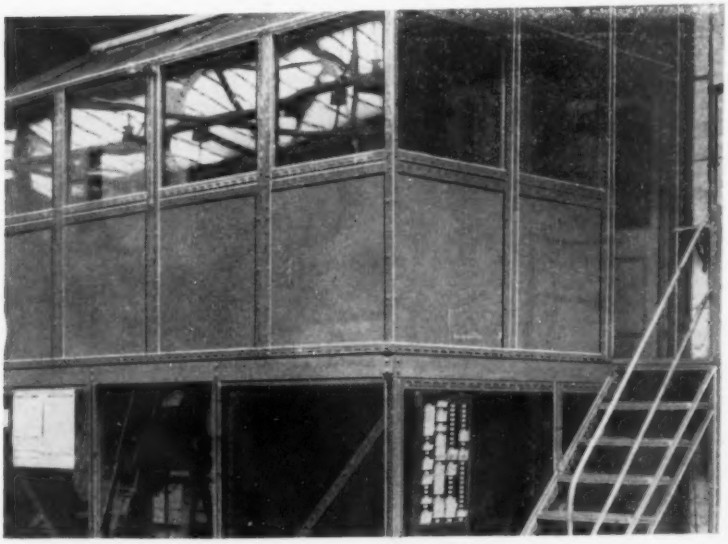
POTTERTON *Oil-Fired* **BOILERS**

DLR 498

IT PAYS TO THINK OF DEXION

–at the planning stage

Service Depot builds storage platform. *Iron Bridge Service Depot Ltd. of Southall, Middlesex, built this overhead storage platform to carry 20 tons of motor-car parts. It effects a big saving in space, and the supports also serve as dividers for storage bins. Storage structures of Dexion can make full use of any existing space; and they have the great advantage of ensuring easy adaptability to changing needs.*



Machine Shop Engineer's office quickly built. *Thomas Allan & Sons Ltd. of Thornaby designed this office with tool store underneath to be built with conventional materials. They used Dexion instead when they found it was quicker and cost less. In jobs of this sort, Dexion invariably supersedes old-fashioned materials and methods.*

A FACTORY LAYOUT must be flexible, capable of being adapted at short notice to changing circumstances. This applies particularly to storage requirements and works equipment.

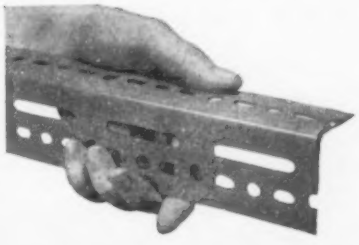
There is no more versatile material for building stores and equipment, exactly to your own designs, than Dexion Slotted Angle. Such Dexion equipment is quick and cheap to install. And any Dexion structure can be readily adapted and altered to meet changing needs. There is no waste, no scrap: Dexion is fully recoverable, and can be used again and again.

When you are planning the building and layout of a factory, Dexion deserves careful consideration at an early stage. This versatile material may bring about important economies, initially and for years to come.

A technical design and estimating service is available free; and for large installations, construction teams will carry out the work if required.

GET THE FACTS

Dexion 225 is sold in packets of ten 10-ft. lengths, complete with bolts. Steel Dexion (price from 1/3½ to 1/5 per foot) is rust-protected, stove-enamelled. Where a light but strong, non-magnetic, non-corroding material is required, use Alloy Dexion (full technical details and prices on request). Send today for sample piece of Dexion and illustrated booklet AN.144 showing many uses in industry. Dexion Ltd., 65 Maygrove Rd., London, N.W.6. (Telephone MAlda Vale 6031-9.)



DEXION

REGD.

SLOTTED ANGLE

Architects: Sir John Burnet, Tait and Partners. Quantity Surveyors: Messrs. E. C. Harris & Partners. Consulting Engineer: Alfred E. Beer, Esq., A.C.G.I., A.M.I.C.E., M.I. Struct. E.

Monsanto House
Victoria Street, Westminster
for Site Improvements Ltd

This important contract is being carried out by Cubitts' Structural Engineering and Building Departments. Precast concrete construction has been used for the main frame, external panel walling and staircases. An average of 10 days for the erection of each floor of nearly 13,000 square feet has been maintained.

NOW, AS IN THE PAST

CUBITTS

BUILD FOR THE FUTURE

ENGLAND · SCOTLAND · OVERSEAS

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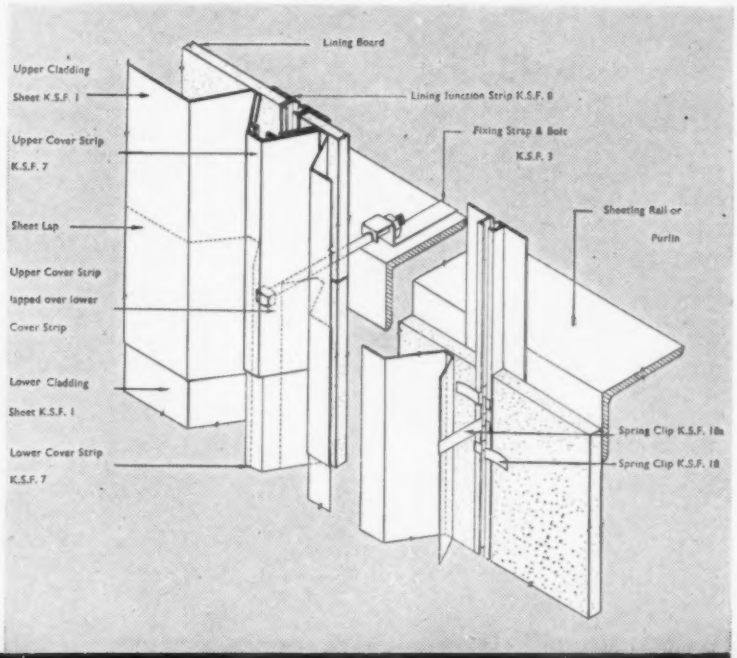
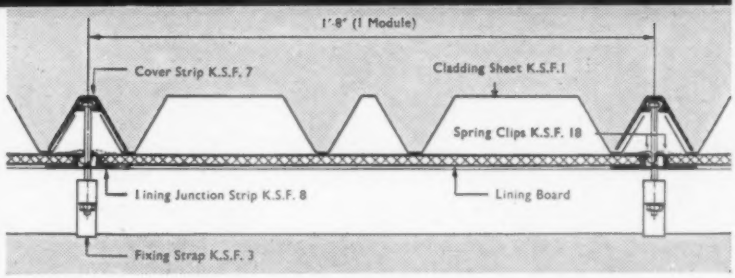
TGA C186

A new roof and wall cladding


Lining Board
Upper Cladding Sheet K.S.F. 1
Lining Junction Strip K.S.F. 8
Upper Cover Strip K.S.F. 7
Fixing Strap & Bolt K.S.F. 3
Sheeting Rail or Purlin
Sheet Lap
Upper Cover Strip lapped over lower Cover Strip
Lower Cladding Sheet K.S.F. 1
Spring Clip K.S.F. 18a
Lower Cover Strip K.S.F. 7
Spring Clip K.S.F. 18

'KYNALOK'

Secret-fix



The 'Kynalok' *Secret-fix* system offers a greatly improved method of roof and wall cladding, using 'Kynal' aluminium alloy profiled sheets and extrusions, with provision for insulating lining. Both cladding and insulation are erected at one and the same time, using fixings common to both.

The cladding is held in position by an extruded aluminium alloy cover strip which accepts the head of the fixing bolts on its underside; there are thus no protruding bolt heads and no drilling of the cladding is required.

Licensed under British Patent Nos. 648,527, 699,054 and 699,055 and British Patent Application No. 14281/54.

Descriptive brochure will gladly be sent on request.

SEVEN GOOD REASONS FOR USING 'KYNALOK' *Secret-fix.*

1 **Extremely strong and durable.**

2 **Neat and distinctive—all bolts concealed.**

3 **Easy to erect and demount.**

4 **Adaptable to any metal or wood frame.**

5 **High thermal insulation.**

6 **Insulation lining fixed integrally.**

7 **Light to transport.**

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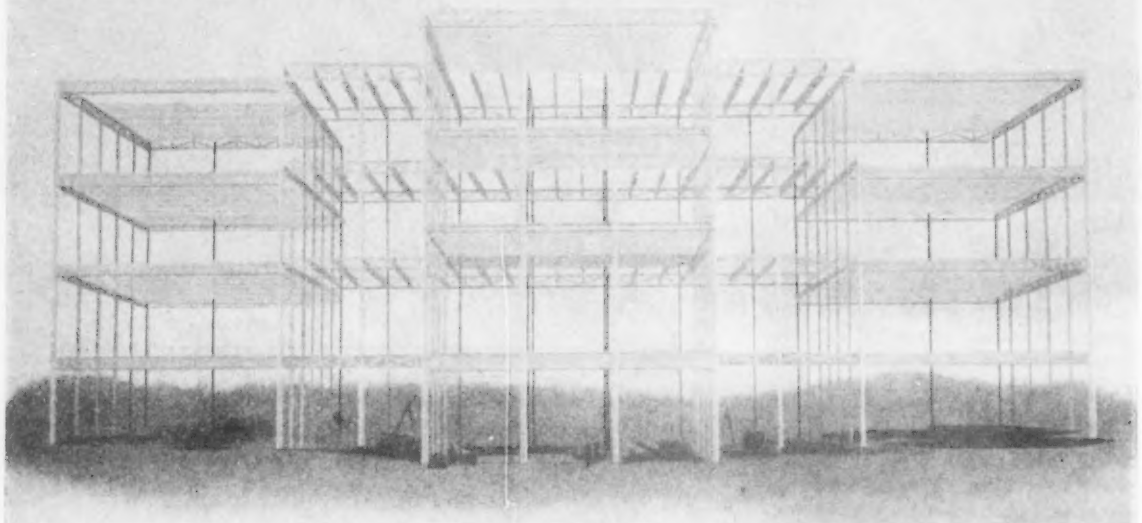
UNITED STEEL STRUCTURAL CO. LTD.
THE UNITED STEEL COMPANIES LTD.



We design, fabricate & erect
structural steelwork

UNITED STEEL STRUCTURAL COMPANY LIMITED
Associated with The United Steel Companies Limited
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USS.16

if the coat fits...

. . . thanks are due to the individual attention of the tailor who takes pride in his job. His devotion to detail results in faultless fit; his unceasing care wins our confidence. So it is with the tailors of industry—the chemists and technicians who "make to measure" the paints and finishes which are the protective coats of industry. We at Cellon never rest in our endeavours to meet these greatly varying and highly exacting needs with individual attention. Moreover, each coat is rigorously tested to make certain it will give the longest possible wear under the individual conditions for which it was made.

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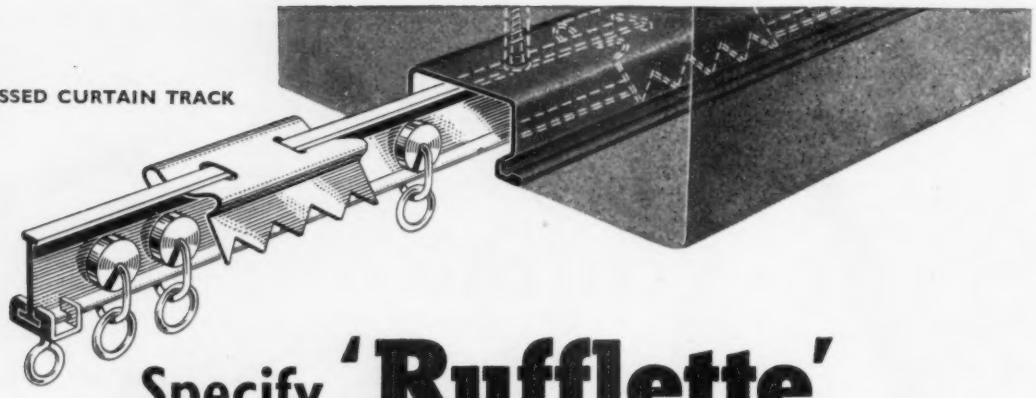
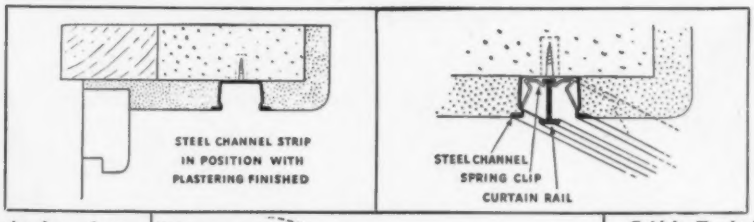


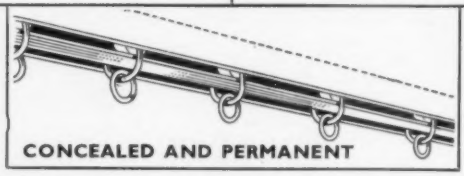
Specify 'Rufflette' (Pat. & Regd.) BRAND CURTAIN TRACK SYSTEMS

*** SEE OUR PERMANENT EXHIBITS AT THE BUILDING CENTRE IN LONDON & GLASGOW**

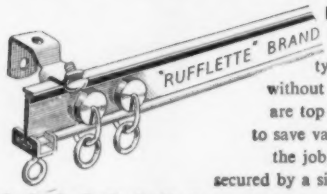
"Rufflette" Brand Recessed Curtain Track represents the perfect method of curtain suspension, being concealed, permanent and inexpensive. It is an integral part of the structure and can be fitted into wood or plaster lintels. The track is locked in position by a patent spring clip without screws. Many architects specify this product in new buildings.



"Rufflette" Brand Tracks have been installed by many local authorities including Ilford, Wandsworth, Lewisham, Willesden, Finchley, Wood Green, Poplar, Wimbledon, Greenwich, Stoke Newington, Islington, Holborn, Leyton & West Ham Borough Councils. Also London, Bucks, Surrey, Middlesex & Essex County Councils.



Cubicle Track installations have been made for many hospitals including Edgware Gen., Mount Vernon, Richmond, Bushey Maternity, Northwood & Pinner Gen., Liverpool Stanley, East Suffolk & Ipswich, Southmead Bristol, Newcastle Gen., Darlington, Warrington Infy., and the Liverpool Royal Infy., and also for many municipal undertakings.

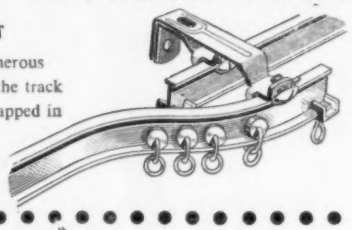


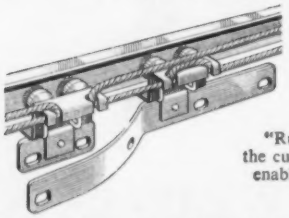
B/L TYPE TRACK

A strong track for all types of window, with or without cord control. Brackets are top or face fixing, designed to save valuable time and cost on the job, the track being rigidly secured by a single front-facing screw.

OVERLAP BRACKET

In order to give a generous overlap for curtains, the track can be cut and over-lapped in the centre, using the special BL7 bracket.

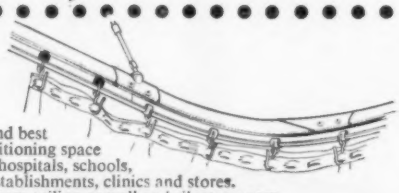




CORD CONTROL

On straight track, curtains can be effortlessly opened and closed with this "Rufflette" Cord Control. Note the curved travelling section which enables curtains to be overlapped without cutting the track.

CUBICLE TRACK

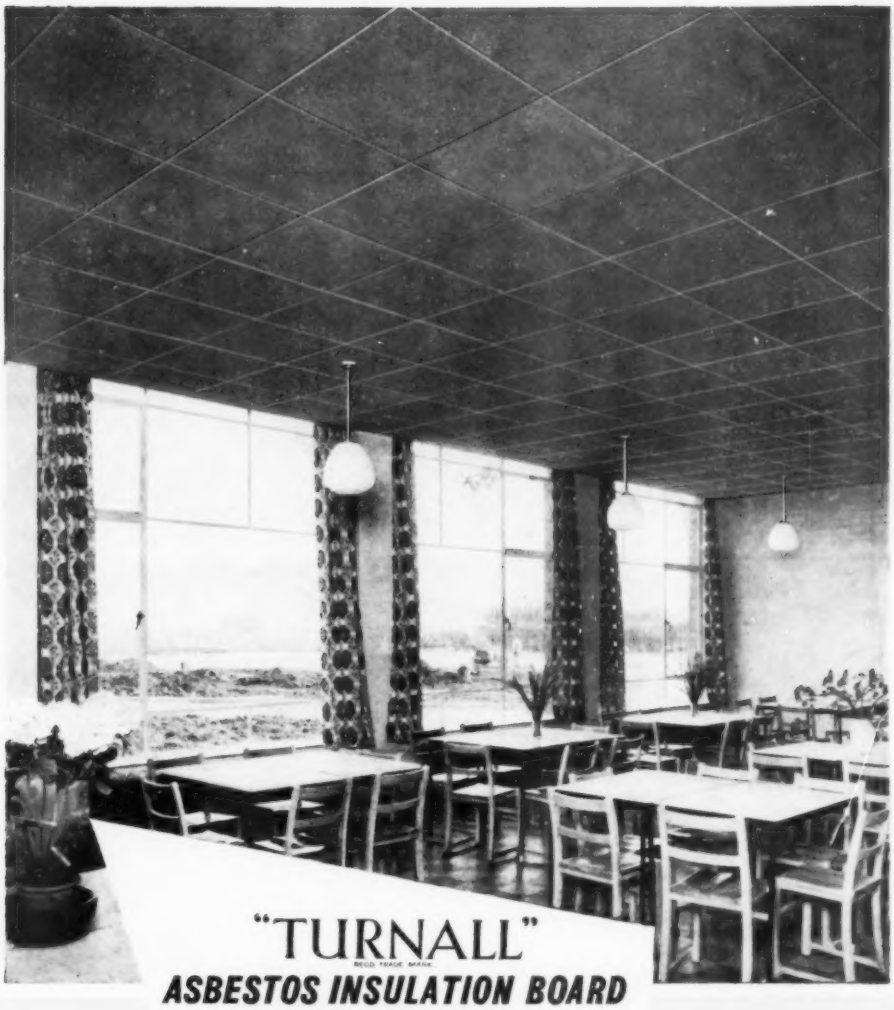


The simplest and best method of partitioning space by curtains, in hospitals, schools, hairdressing establishments, clinics and stores. Suspension is from ceiling or wall and silent runners make the operation of curtains almost inaudible.

FULLY ILLUSTRATED CATALOGUE WILL BE SENT ON REQUEST TO:—

THOMAS FRENCH & SONS LTD. HEAD OFFICE: CHESTER RD, MANCHESTER, 15.

Also at Wythenshawe and London, Associate Company in U.S.A.



"TURNALL"
REGD. TRADE MARK.

ASBESTOS INSULATION BOARD CEILING PANELS

The illustration shows the ceiling to the Dining Room at Offerton Secondary Modern School, Stockport, where "TURNALL" Asbestos Insulation Board Ceiling Panels have been used to provide a pleasing effect. The Ceiling Panels are supplied in 2′ 0″ x 2′ 0″ sizes either $\frac{3}{8}$″ or $\frac{1}{2}$″ thick, chamfered on all four exposed edges and can be fixed direct to timber battens or alternatively secured to metal tee sections by concealed fixings.

Architects: Education Architects Department, Stockport.

TURNERS ASBESTOS CEMENT CO LTD

A MEMBER OF THE TURNER & NEWALL ORGANISATION

TRAFFORD PARK MANCHESTER 17

INS 5

C

SPECIAL PLYWOOD NEWS!

Two "Utility" grades offer REDUCED COSTS!

NOW . . . as well as in high-grade panels, SEABOARD Canadian Douglas fir plywood is available in two new "Utility," unsanded grades! These are especially produced, with the same dependable full phenolic bond as are all Seaboard fir plywoods, and with no sacrifice of structural strength — for all purposes where **both strength and economy** are more important than a quality finish.

SHEATHING and

Only Douglas fir

Seaboard SHEATHING and/or UNDERLAY can sharply reduce costs when used for:

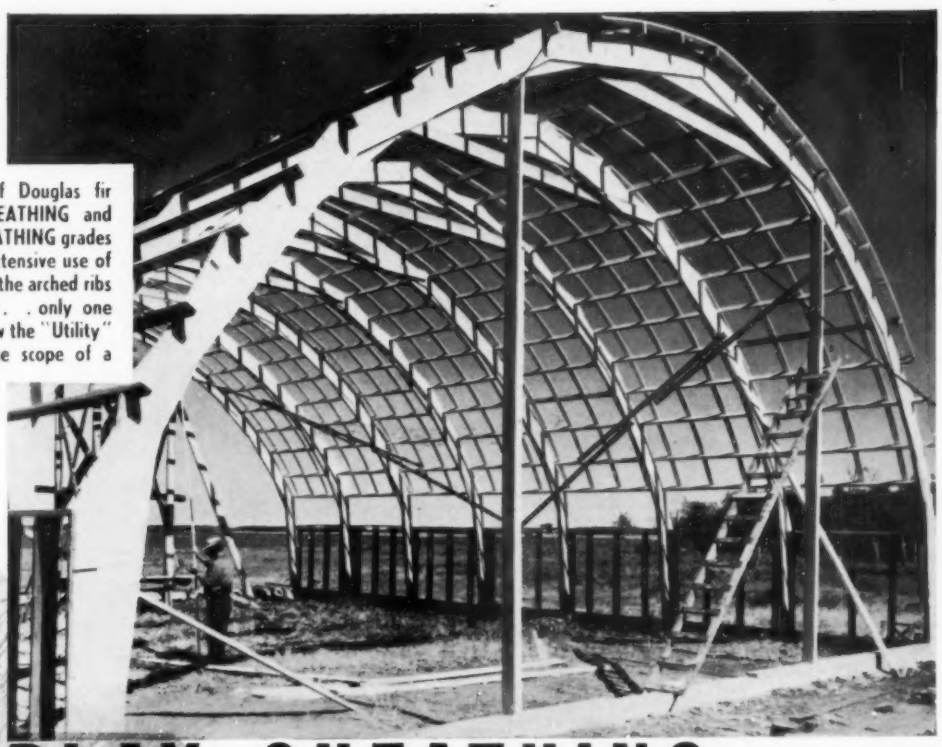
BOX BEAMS
LAMINATED PLYWOOD TRUSSES
GUSSETS
PORTABLE BUILDINGS—
CONTRACTORS' HUTS, ETC.
FARM STRUCTURES
HOARDINGS AND BARRICADES
AROUND BUILDINGS
UNDER CONSTRUCTION
CONCRETE SHUTTERING
PACKING CASES
INDUSTRIAL PALLETS
FLOORS—BASE FOR LINOLEUM,
TILES, CARPETS, ETC.
ROOF DECKINGS OR SARKING—
BASE FOR ROLL ROOFINGS, ETC.
IRRIGATION FLUMES
SOLID BASES FOR OTHER MATERIALS . . .

. . . anywhere strength, rigidity, and low cost are first considerations!

UNDERLAY SHEATHING — Unsanded. This is the SHEATHING grade with one face improved; all open defects exceeding 3/16" are replaced with permanent wooden inlays and synthetic patches. Face contains sound and tight knots. Panel back conforms to one face of SHEATHING grade.

SHEATHING — Unsanded. This grade permits open defects of limited size on both faces of panel as long as strength and serviceability are not affected.

There are 6 other grades of Seaboard Douglas fir plywood available to the market besides SHEATHING and UNDERLAY: Good Two Sides (G2S)—Good One Side Solid Back (G/Solid)—Good One Side (G1S)—Solid Two Sides (Solid 2S)—Solid One Side (Solid 1S)—and Select Marine (for building watercraft—especially produced for hulls); also decorative plywoods for shopfitting, displays, and many other uses.



The economy of Douglas fir plywood in **SHEATHING** and **UNDERLAY SHEATHING** grades permitted the extensive use of plywood to form the arched ribs of this structure . . only one illustration of how the "Utility" panels widen the scope of a designer

UNDERLAY SHEATHING

plywood offers these two special grades.

Designers, builders, and manufacturers will welcome this news! No longer will they have to reluctantly leave plywood out of their specifications in those thousand-and-one locations, outdoors or indoors, where its amazing properties are needed, yet where a "top panelling grade" is obviously too costly! **SHEATHING and UNDERLAY SHEATHING are priced much below other plywoods formerly available for such general structural uses!**

PHENOLIC BOND
WATERPROOF
WEATHERPROOF
BOIL TESTED

SEABOARD

CANADIAN DOUGLAS FIR

PLYWOOD

Worth investigating

If your usual supplier of plywoods does not stock Seaboard Douglas fir plywood in SHEATHING and UNDERLAY grades—he can order it for you.

Standard panel sizes: 8 x 4 ft. (Lengths up to 10 feet may be ordered, also scarf-jointed panels up to 40 feet!)

Thicknesses: 5/16, 3/8, 1/2, 5/8, and 3/4 inches.

SEABOARD LUMBER SALES CO. LIMITED
1-3 REGENT STREET, LONDON, S.W.1

Please send a free copy of the SEABOARD PLYWOOD HANDBOOK describing your full selection of Douglas fir plywoods.

Name .....

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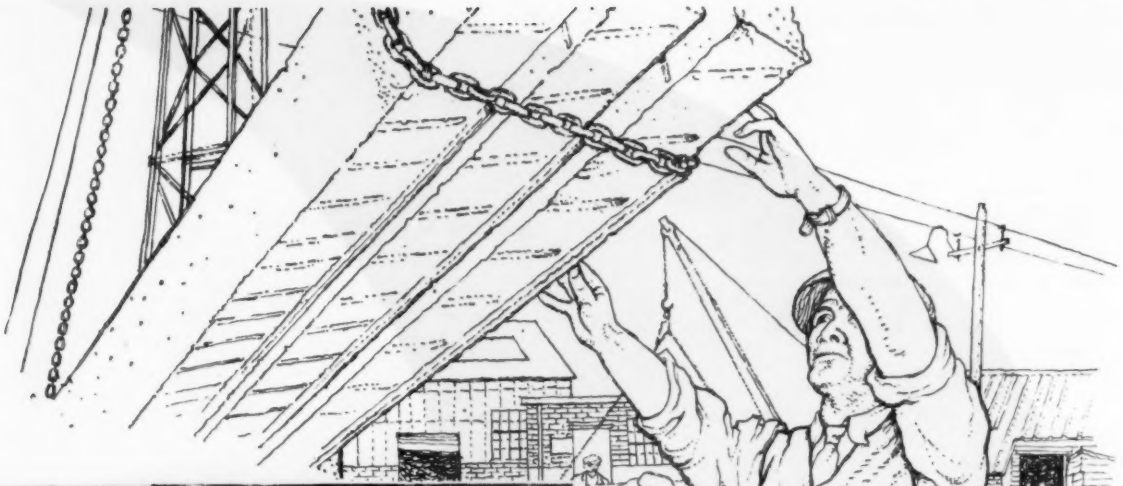

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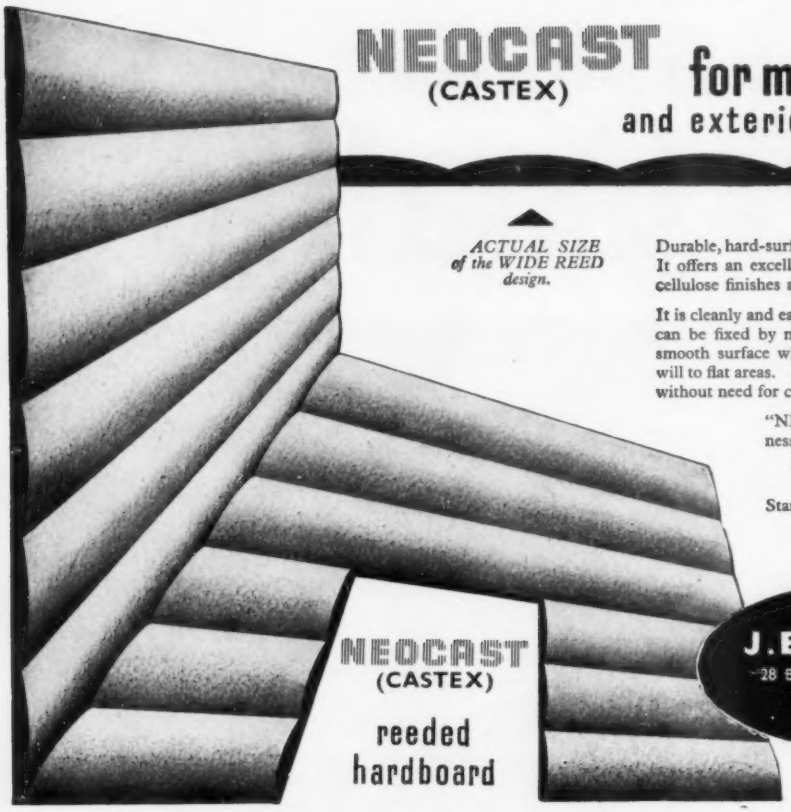

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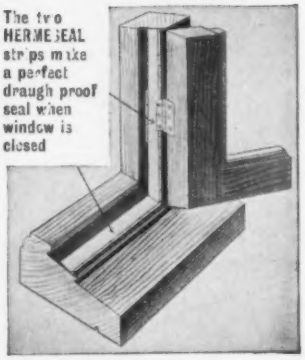

BEFORE draught-exclusion = 1903.0 cu. ft. per hr.
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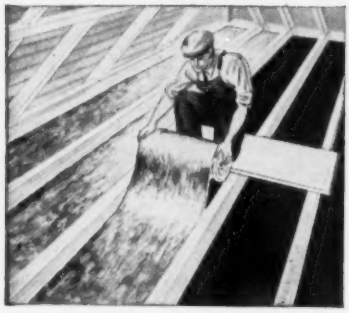

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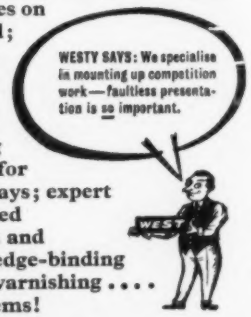

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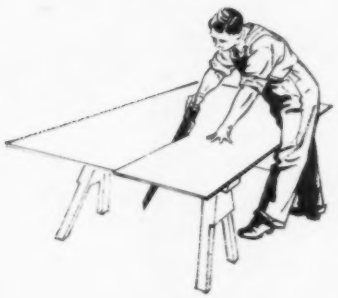

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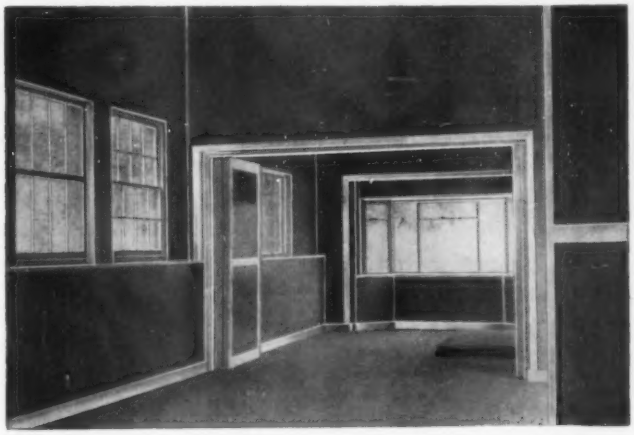

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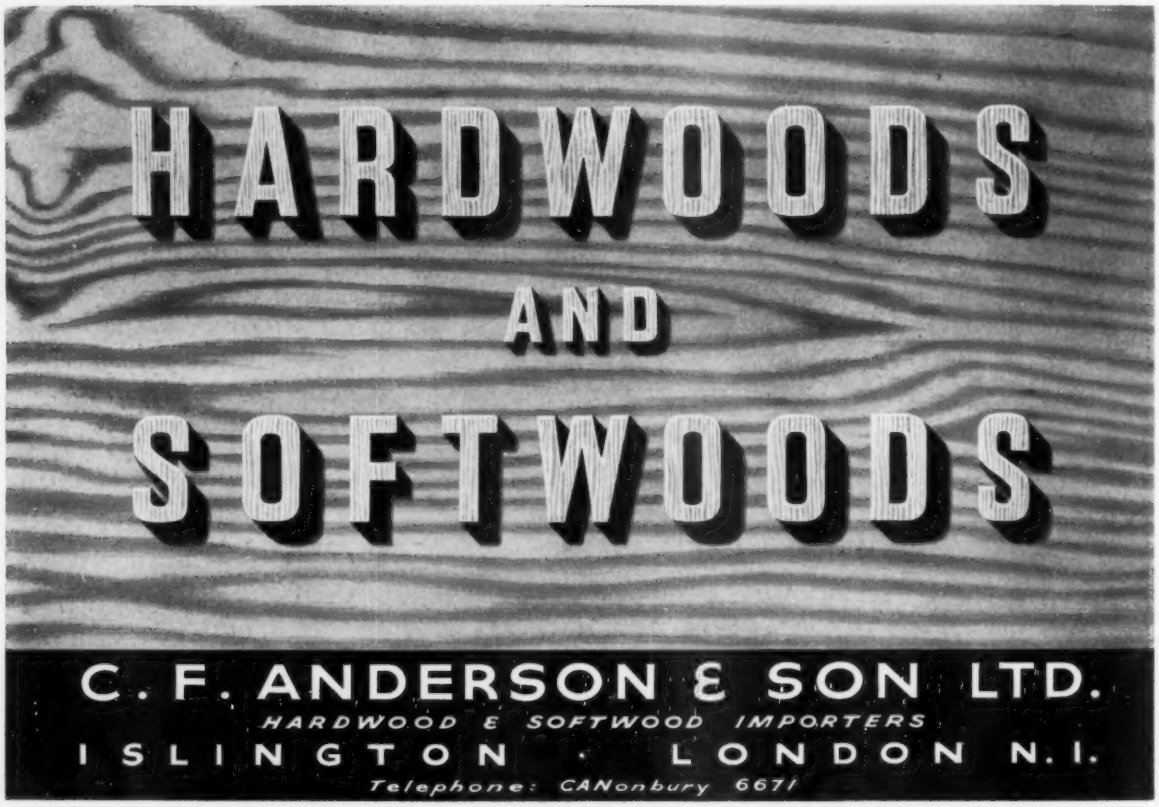

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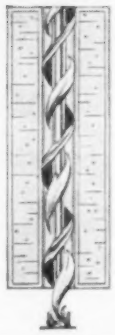
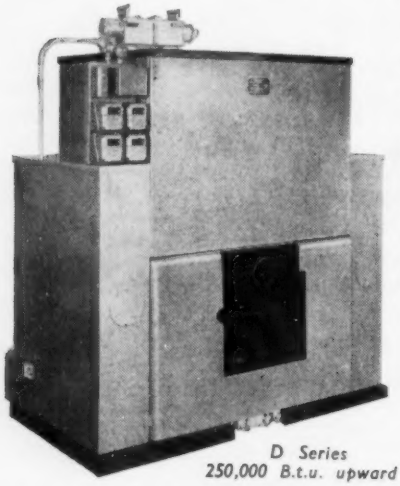


A Tubotherm element



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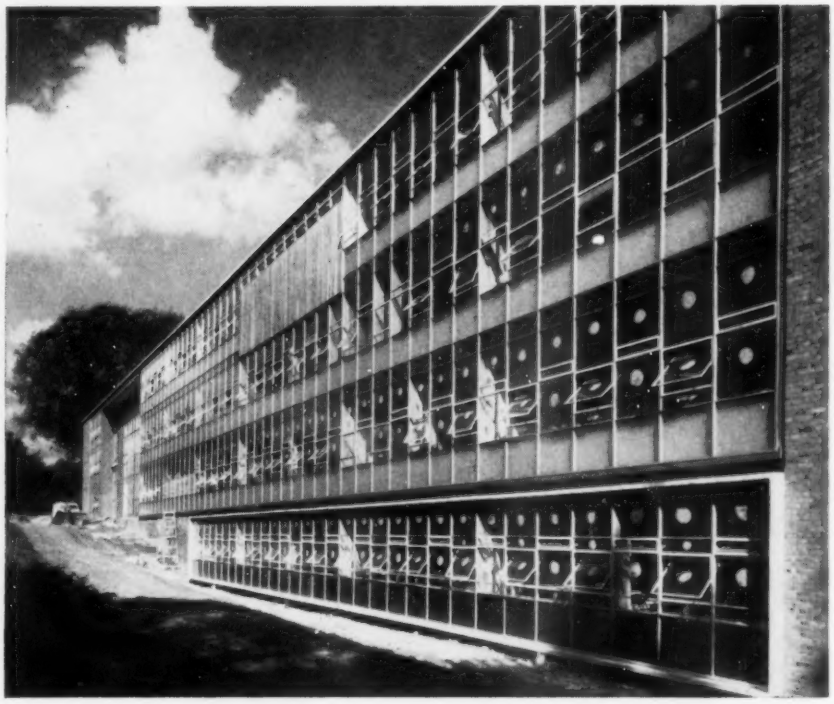

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Vol. 209 No. 6

THE ARCHITECT & BUILDING NEWS

9 February, 1956

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NEW BARBICAN

BEFORE the dust of battle has had time to settle on the eight day enquiry into the scheme put forward by Sir Gerald Barry's Committee for the re-development of the Barbican area of the City, comes the report that the Minister of Housing and Local Government has approved compulsory orders for the purchase by the City Corporation of six more sites in that area. Although approval of the compulsory purchase orders and the enquiry are not directly connected (since the machinery for the former must have been set in motion months ago) confirmation by the Minister and the fact that compensation to the owners of the land to the tune of £85,000 has to be paid, so it is reported, focuses attention once more on the great opportunity for doing something worthwhile which this site presents, and the financial burden which has to be borne by the City rates all the time the land is left idle.

There remain no more doubts now that in the plan of the New Barbican Committee and that of the City Corporation and the L.C.C.—the Martin-Mealand plan as it became known at the enquiry—there is a common intention to develop the site comprehensively. That battle appears to be won and all are indebted to the planners of the New Barbican scheme for the service which they have rendered to the community in starting the ball rolling in that direction. But there may well be misgivings in some quarters that the actual physical results of the Barbican site development will be found by posterity to bear little resemblance to the original paper plan for the comprehensive scheme.

The substance of this argument was one of the chief points made by Mr. Harris, Counsel for the New Barbican Committee, in his appeal for reconsideration of the Committee's plan. In summing up his clients' case, Mr. Harris referred to the two methods of comprehensive development proposed respectively by the Committee and the City Corporation. Mr. Harris called the New Barbican scheme, "intentional" development, the cardinal principles of which were that one scheme was carried out as an organic whole by one developing authority, even if the actual work could not be done all at one time. The Martin-Mealand plan, Mr. Harris termed "wishful" development, and suggested it "was a paper plan produced in the hope that persons will come forward eventually but at no certain time to develop if and when they please." Mr. Harris submitted that the Barbican scheme was the only scheme for this area which had been placed before the Minister. The Martin-Mealand plan according to the evidence was the combination of two plans and the product of many months of hard study and collaboration between the City and the L.C.C. But it appeared to be in no way final, as there was no minute to the effect that it had received the approval of either the Court of Common Council or the Planning Committee of the L.C.C.; moreover, it had been found necessary to call in consultants to advise the City on the residential part within the whole.

Heaviest criticism of the New Barbican scheme during the enquiry were based on the ground on which planning permission was refused in May 1955.

Mr. Harris dealing with the first ground of refusal: "the proposed development would, in so far as offices and industrial user are concerned, be contrary to the use zoning proposals of the County of London Plan"—pointed out that "offices" could be expunged, because it had been said in public that plans were afoot to ask the Minister to alter the proposals in the Development Plan. It was also apparent that the Martin-Mealand plan contained office blocks of some 27 storeys in height.

Interlinked with refusal No. 1 was refusal No. 2: "That the proposal to introduce a large area of industrial buildings would be contrary to the declared aims of the County of London Development Plan to decentralise industry and commerce in correspondence with the reduction of population." Mr. Harris went to some lengths to explain what was meant by warehouse accommodation and "supporting industries" in the Barbican Scheme. The Board of Trade had sanctioned a Certificate to the committee, who believed that it was right to include a measure of industry in their scheme, without in any way desiring to run contra to government policy.

The third ground of refusal was one of density. On this score a difference of opinion arose between the two sides—the Barbican Committee and the City Corporation—as to what day time population the Barbican scheme would provide.

The end product of the population envisaged for the

Barbican scheme was stated to be 27,000; but the City Corporation say that the scheme would provide for a population of over 40,000, which is too many. The Barbican Committee believe that the formula upon which plot ratio is based for deciding these figures in normal circumstances was not designed when their type of multiple user was thought of, and that their figures may not be so full of fault when examined in detail.

These and many other questions, as for example the possibility of endangering St. Paul's by massive engineering works, are matters for further investigation and settlement.

Whatever the Minister's decision on the appeal may be, the fact still remains that the Barbican site is the last area for real comprehensive development left in the city and the last chance to seize an opportunity for a scale of re-development which has not occurred since the Great Fire. Whatever scheme is adopted should match the opportunity presented. The authorities should be bold about Barbican.

EVENTS AND COMMENTS

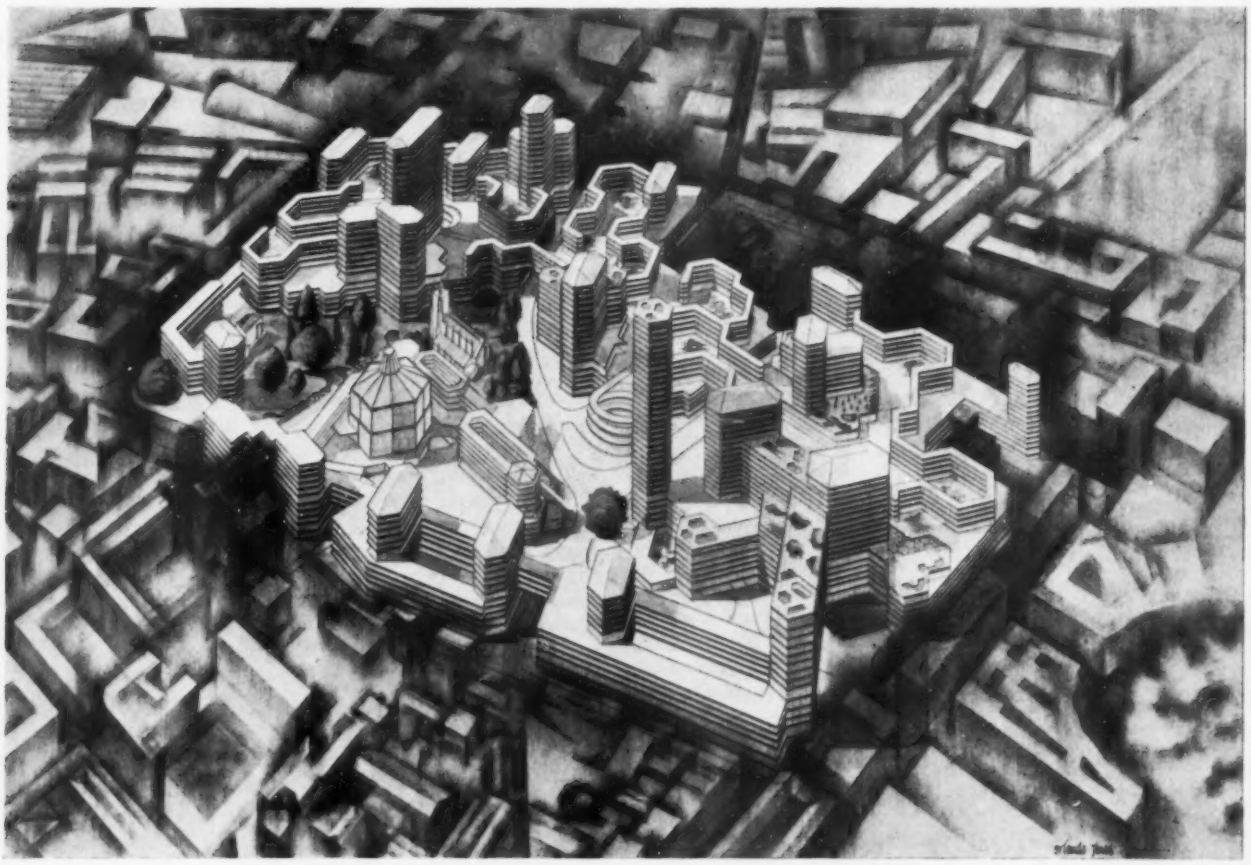
EXHIBITION OF MODERN BRITISH ARCHITECTURE II.

Mr Philip James in a letter on another page reproves me for my reference to the MARS group in connection with the Arts Council Exhibition. I admit that I was guilty of inaccuracy in omitting Mr. Lionel Brett from the selection committee and in saying that Mr. John Summerson is a member of the MARS group. Actually both Mr. Summerson and Mr. Brett were members of MARS in 1950, according to my membership list.

What puzzles me however is that Mr. James should be worried. When I mentioned the predominantly MARS committee I did so with the intention of pointing out that we might expect the exhibition to be first class and to represent the very best that modern British architecture has to show.

OUTLINE PROPOSALS FOR NEW BARBICAN

The plan on the facing page shows the scheme for the Barbican area prepared jointly for the City Corporation and the London County Council, under the direction of Anthony Mealand, City Planning Officer and Dr. J. L. Martin, Chief Architect to the L.C.C. Below is a perspective of the scheme prepared by Sergei Kadleigh, William Whitfield and Patrick Horsbrugh for Sir Gerald Barry's Barbican Committee.



That Mr. James should think that his committee has chosen buildings representing the mid-stream of architectural development is indeed a tribute to MARS, and shows quite clearly that the group's long continued efforts to develop the public appreciation of modern architecture have not been entirely in vain.

As for manifestos, why, MARS has not issued one for years. They went out of fashion with the new eclecticism.

HELICOPTER FANS

I am also in trouble with the helicopter fans. Several kind people have assured me that everything is quite all right if the engine stops, particularly if the machine happens to be on the ground.

However the fact that a platform in the Thames is highly inevitable for the beastly things in no way alters my opinion that it is abusing London's river.

As to the crack about space travel (utter bilge), Mr. Ryder should know that it was the Astronomer Royal who was reported to have said that or something similar, and for doing so he was severely castigated in the columns of the national press.

B.S. COLOUR RANGE

The new British Standard Colour Range is out. You cannot say that you were not warned for the draft proposals were in view for a long time in several places. The eminence of the members of the committee makes me diffident about commenting on the scarcities of bright colours. However, everyone had a hand in it and I believe the B.R.S. did a lot of the work. An unkind friend called them Mousey Garston colours.

To be fair it is a good range and should suffice. If, however, you insist on something a little more red or less blue, you may still order it but it may cost more and resist less.

Everyone now hopes that manufacturers of coloured floorings, sheet materials, etc., will use these colours for their products.

NETLEY HOSPITAL

The G.O.C.-in-C. Southern Command, General Sir George Erskine, has recommended to the War Office that the main building of Netley Military Hospital overlooking Southampton Water should be pulled down.

The building of Netley Hospital had begun before Florence Nightingale returned from the Crimea. When she examined the plans they were found to be hopelessly out-of-date. She took them along to Lord Palmerston and convinced him of the necessity for re-designing Netley. The Prime Minister actually wrote to the W.O. that "at Netley all consideration of what would best tend to the comfort and recovery of the patients has been sacrificed to the vanity of the architect whose sole object has been to make a building which should cut a dash when looked at from the Southampton river." But to no effect; the hospital was completed with the patients' windows facing north-east.

THREAT TO IMPERIAL INSTITUTE

Although we perhaps need shed no tears over Netley there will be mixed feelings about the proposal to demolish the Imperial Institute in South Kensington. Colcutt's building is said to be unadaptable to any present day use. Already one hears of the marshalling of protestors. Surely the leader must be Mr. Goodhart Rendel, who, speaking at the R.I.B.A. on 6th December said that he regarded the Imperial Institute as one of London's most beautiful possessions. He went on to mention the rumoured proposal to demolish it in favour of a more useful building and said that he considered this as being tantamount to removing the fountain in Piccadilly Circus and replacing it with a really adequate comfort station.

I do think that it would be a crime to pull down the tower which I have always regarded as one of London's best.

ABNER

Correspondence

Dear Sir,

One would think, to judge from Abner's weekly notes in your current issue, that a Martian invasion, planned by an Arts Council fifth column, was imminent. Abner omits from the list of names of the Selection Committee for our forthcoming exhibition "Ten Years of British Architecture, 1945 - 55", Mr. Lionel Brett, who is not a member of the Mars Group, and he is not correct in stating that Mr John Summerson is a member of the Group.

The choice of the committee was made entirely on the grounds of their suitability to provide an exhibition which showed some unity and conviction. Clearly with the limited funds and space available some restriction on the scope of the exhibition was inevitable and a comprehensive cross-section of the contemporary architecture would have been something quite different and would necessarily have been many times larger. It is sincerely believed that this exhibition illustrates what has been called "the mid-stream of architectural development": it has nothing to do with manifestos.

Yours faithfully,
PHILIP JAMES.
Director of Art, The Arts Council of Great Britain

Report on the Symposium on Drawing Office Technique held at the R.I.B.A. on 17 January

Mr. PETER SHEPHEARD, A.R.I.B.A., in the Chair

TOO much time is spent in the office on almost any job, and yet the builders complain about lack of information or information not received in time, the quantity surveyor is forced to produce whole bills with only a scruffy 1/8 or 1/16 scale drawing to guide him and the overheads go up and up and the architect's bank balance goes down and down. This would not be so bad if exceptionally fine architecture were to result, but how rare this is! All the emphasis seems to go in the wrong direction and the architect appears to be an utter amateur in running his practice so that he has no time or money to spare for the one and only aspect of his profession for which, after all said and done, he is or should be really equipped, that of the creative designer.

I know it is almost heresy to use this term outside a school's studio, but let us be honest, it is what the best among us have set out to be, and the rest is business routine forced on us with results as stated before.

Thoughts like these must have been in the minds of those by whom this symposium was convened and it must be in the minds of many judging by the vast number who attended this meeting.

In the ante-room to the Henry Jarvis Hall drawings were shown by several firms and groups, covering essentially a whole job at a time, to illustrate how some at least solved the office side of their problems. I do not know what dictated the selection, but—with few notable exceptions—the drawings seemed much the usual run, namely, $\frac{1}{8}$", $\frac{1}{2}$", full size, some $\frac{1}{4}$", but nowhere was there the freely sketched detail, the isometric, the freehand technique in general. Scales followed convention rather than particular requirements; there was the irritating technique of dimension lines far remote from their objects and even the over-crossing of small dimensions over large! How much time can be wasted if one has to travel inches over ungainly sheets from a point of measurement to the pier, column, opening, etc. to which the dimension refers, if one does not miss it altogether en route! There was no lettering in handwriting, hardly any simple key drawings as bases to detail, there were drawings repeating rows and rows of windows to a large scale and even the full size of a standard window section!

Of course, it is not only drawing technique, it is the whole gamut of procedure which contributes to the clutter surrounding each job, the tendering system, and the still existing gulf between builder and architect. Different architect-builder relations would help much to simplify, expedite and cheapen procedure, not only for the architect, but also for the client and would contribute to freeing the architect for the essential task of designing.

The purpose of the symposium was to find ways and means to remedy all this, and each speaker made a valuable contribution to this end. The first was Michael Powell from the L.C.C. He made a point of standard details, imperial sheet drawings and typewritten letter-

ing. Drawings in ink were easier to correct in a clean manner than pencil. Standard details were produced in 1½″ scale.

The next speaker was Henry Elder, but I would rather leave him to the end.

William Mullins gave a paper for which he had been jointly responsible with Richard Sheppard. He came closer to the problem of scale and drawing organization by explaining how hidebound our conventional approach proved to be in the light of modern building technique. The full size was for the 17th and 18th century stone mason and the eighth scale elevation derived from 19th century Pugin type drawings where elevations were what chiefly mattered. Drawings, he said, should be geared more to the industry who use them. Standard key drawings can give all that is required for buildings built up of standard components and 1/4 full sizes dimensioned, all that was needed for detailing. Information should only be given once. Once again the typical "school drawing" came under the weather, the type that showed everything the student knew over and over again on the same sheet! Again also a reference to the typewriter, to give schedules of information, once only, for each item.

The next speaker was Gordon Tait. He blamed Local Authorities chiefly for ther insistence on the ⅛″ scale drawing, when 1/16″ might well do the job. He stressed the need for careful elevation drawings, particularly of the internal elevations which are so often left to chance. Pre-titled sheets and other standard notations contributed to economy in drawing procedure. He assessed two minutes saved in lettering at one shilling which was equivalent to 30 shillings an hour which many in the audience were quick to calculate and which appears very expensive indeed.

The undoubtedly most significant contribution came from Henry Elder. It is probably unfair to say too much about it at this stage as Mr. Elder is undertaking research into the whole problem of drawing and communication with the industry under a Leverhulme research grant. What he had to say he regarded himself merely as an interim report. However, fundamentally his approach is based on a scientific analysis of the needs of the builder, resulting in supplying drawings and information in the form and order required. For this reason Mr. Elder breaks down the drawings into basic types: (a) for the client, (b) for the Local Authority, (c) for the quantity survey and (d) for the builders. Of these only (c) and (d) would fit together.

These latter drawings are then broken down into trades in just the same way as the foreman would do on the site, except that he would usually have to abstract these from over-complicated drawings of the type that showed "everything". The builder did not want to know what the architect's thoughts were, but the result of his thinking! Further, all drawings were foolscap or multiples of foolscap and handed to the builder's foreman bound in a convenient folder so that on the job there was nothing of the well-known "sails in the wind".

As seen in the exhibition in the Henry Jarvis Hall, Mr. Elder's drawings were simplicity in themselves, and (this was the evening's only reference to "Architecture") this form Mr. Elder thought led to simple and disciplined architecture. The foreman liked the method and so did the quantity surveyor. Generally he adapted the scale to the work and so confirmed one of Mr. Mullins' points.

Apart from the communication to the builder, Mr. Elder had studied the production of drawings as such. There should be of course as few mistakes as possible and he showed a chart where the incidence of errors was plotted against time in an eight hour working day. According to this the minimum of mistakes occur during the second hour after which the curve of errors rises with the progress of time. (It seems one should not work more than two hours!)

After all this we heard the story from the receiving end. Mr. Peter Trench, Managing Director of Bovis, agreed with most of the stipulations made in one form or another by previous speakers, but from what he said, practice seems to lag sadly behind theory. What was needed was the right sequence of information received, clarity and precision should come before beauty. It may not be necessary to have all the drawings before the job started, but sequence, particularly nowadays when so many materials were in short supply, was absolutely vital. His firm issued a list of requirements at the outset and this may often not tally with the sequence on the job, but enabled the builder to place orders in time. He also stressed the need for simplicity and once again—schools should note!—he criticised the drawing which would give too much information. Much more thought could be given to the written word and to schedules and clear references and numbers. Mr. Trench made a special plea for clearer marking of revisions. He enlarged on the early cooperation with the architect in which his firm of course specialises which would help towards efficiency, a method becoming more and more accepted.

While one would like to agree with Mr. Trench that this was indeed a method to come, unfortunately there are not many builders as yet who could be set going on a major scheme by instructions written on a table napkin at the Dorchester or a scrap of paper like Montgomery's marching orders for D-day, both items cited by Mr. Trench at the beginning of his brilliant paper.

The discussion went on till nearly 9 p.m. and covered every aspect, from drawings communicated over the telephone to isometric sketches and Mr. Grenfell Baines point of completely separating the design process from the working drawing by solving all problems of design and structure completely before working drawings begin. The careful programming stipulated by so many speakers was questioned by one member from the floor as being only really possible if the builder was known early on.

One fact seemed to emerge: Architect-Builder relations still are not what they should be, draughting procedure by and large has not yet adapted itself to new techniques, the same may be said of the system of quantities and tendering. Both sides still have a lot to learn. While some members of the building industry are rapidly gaining in efficiency it must be up to the architect to keep the pace so as to be able to retain the lead. Mr. Shepheard, summing up from the chair, regretted that Architecture herself had not been discussed, but, after all, this was a meeting to discuss the means, the ends are bound to follow!

H. WERNER ROSENTHAL.

View from road

BLOOD TRANSFUSION CENTRE, BRENTWOOD

for the North-East Metropolitan Regional Hospital Board

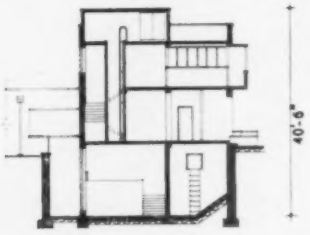
architect: WILLIAM CRABTREE

THIS new Blood Storage building serves the very large area covered by the North Eastern Midland Region Hospital Board. The Centre at present serves approximately 1½ million of the population in the Region, but will ultimately serve the whole Region with a population of over 3 million.

The blood is given free by the donors and is provided free for those in need under the Health Service. Blood is collected by teams who go to the homes and work places of donors and bring the blood to the Centre for processing and storage under carefully supervised conditions of temperature and cleanliness. Many different blood groups make continuous laboratory and research work necessary. The amount of blood used for medical purposes since 1939 has actually increased by about 70 times.

Main Entrance

General Contractor:
S. Cronin & Sons Ltd



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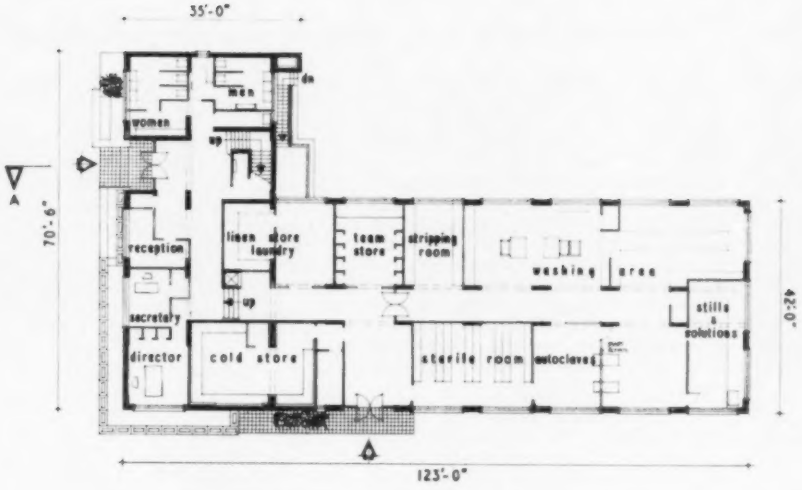
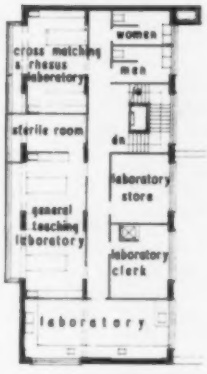


GROUND FLOOR. PLAN.



1st FLOOR

The accommodation is as follows:—On the ground floor. Assembly Room:—Here transfusion-giving and taken sets are assembled and packed with other equipment for the mobile teams. Nearly 4,000 needles have to be inspected and a large proportion re-sharpened each week. Solutions Room:—these are for the production of distilled water which is used in the preparation of solutions for preventing blood from clotting at the time of collection.

Autoclaves (Sterilizers): These operate at a high temperature. They are loaded on the clean side and unloaded on the sterile side of the glass screen. Sterile Store: For the storage of sterilized equipment awaiting issue to the teams and hospitals. Side Entrance: This is the focal point for loading and unloading of all equipment, including bottles of blood to and from the cold store. Cold Store: This is a very large refrigerator capable of storing well over 4,000 bottles of blood. Compressors: For Cold Store and Deep Freeze Rooms.

On the 1st floor the laboratories are used for:—(1) bacteriological tests on samples of blood from donors; (2) the determination of blood groups, examinations of blood specimens and "cross matching" tests; (3) a research laboratory for special investigation into different transfusion problems and other matters.

Construction

The Centre has been designed with a view to future expansion both vertically and laterally, and the internal layout is flexible and can be adapted to changing conditions. The structure is a simple one of brick piers and prestressed concrete roofs and floors; practically no structural steel is used. The cost of the building and equipment was about £80,000.

AN ARCHITECT VISITS BRAZIL VENEZUELA AND MEXICO

A lecture given before a General Meeting of the Architectural Association on January 25th, by Gordon Graham, Dip. Arch., A.R.I.B.A.
The lecturer made a tour of Latin-America in 1955 after being awarded a Scholarship sponsored by the Marley Tile Company Ltd.
Mr. Graham also won the Anglo-Brazilian Essay Prize in 1953.
The lecture was given from brief notes and included comments upon a large number of slides. This article, therefore is not a verbatim report, but is a synopsis prepared by the lecturer of the main points covered in the talk.

"Prometheus," adjacent to the Faculty of Science, University of Mexico

ALMOST exactly one year ago in this room the President, when introducing his fascinating paper about his travels in Italy, very wisely remarked that one should avoid, on occasions like this, giving the impression that one knows more than one really does. I will try to avoid that pitfall, but I am going to say more about Brazil than the other countries because, in fact, I know more about it and, also, because I think that it may be the most important of the three countries for us at this particular stage in our own architectural development.

It was Lucio Costa, one of the pioneers of modern architecture in Brazil, who said that architecture consists of three indivisibly related problems—the technical problem of space organisation, construction and equipment; the sociological problem, including urban and rural planning in all its lyrical complexity; and the plastic problem of architectural expression and the proper relationships between architecture and the other visual arts. I want to review some of the things I saw under these three headings, but I am going to change Costa's sequence of these three aspects of the architectural problem and take the last one—the one which is concerned with plastic quality in architecture—first, because, I believe, it is the most important one for us in this country at the moment.

The Mexico discovered by Cortes—the totality of some three thousand years of archaic and primitive cultures ending in the theocratic society of the Aztecs — was very different from the Brazil discovered by Cabral. There are no Brazilian equivalents for the great Maya and Toltec civilisations, or the magnificent temples and splendid ceremonial squares of the Zapotecs, or the expressive force of the religious art of the Aztecs. Nor are the three centuries of Brazil's colonial history, between the discovery in 1500 and the proclamation of Dom Pedro I as Emperor of an independent Brazil in 1822, particularly marked by cultural achievement. Artistic specialisation had no significant role to play in this period of exploitation and the architecture of colonial Brazil was little more than a mere transplanting of the architecture of the mother country, Portugal. It was an unpretentious architecture, sometimes of great internal splendour, but in no sense was it a native or essentially Brazilian expression.

The nineteenth century in Brazil was dominated by the artistic hegemony of Paris. French academicians, including the architects Grandjean de Montigny and, later, Louis Vauthier, came to Rio de Janeiro at the invitation of Dom Joao, the Prince Regent of Portugal, who, in the face of Napoleon's armies, had fled with a large section of the Portuguese court from Lisbon to Rio de Janeiro in 1807. It was a period of eclecticism and stylistic confusion in all the arts.

Although the present century dawned upon a very vigorous school of painting the choice of native subject matter was insufficient to free the work of painters like Pedro Americo and Vitor Meireles from European influences, and not until after the first World War did the visual arts achieve emancipation in Brazil.

This very brief excursion into the history of cultural development in Brazil is designed to serve two purposes; firstly, to emphasise at the outset that when considering Brazil we are considering a very new country with an independent intellectual life little more than one hundred years old, and, secondly, to underline the somewhat surprising nature of what I believe to be the first and fundamental facet of the contemporary Brazilian architectural achievement. Modern architects in Brazil, enjoying the opportunities presented to them during the building boom which followed the installation of Getulio Vargas as President of the Republic in 1930, provided the world with the first mature example of a whole group of designers achieving a national architectural expression within the universal framework of the Modern Movement. Unlike Mexico, there is little trace in Brazil of the arid inadequacies of doctrinaire functionalism and the International Style. From the early days of the new architecture in Brazil architects of the calibre of Warchavchik, Costa, Levi and Correa Lima realised that the solutions to intellectual problems were insufficient in themselves to constitute architecture, and today, amidst the several and various cries for the humanisation of modern architectural expression, their example is more worthy of appreciation and understanding than most of the sentimental and empirical pandering to immediate mass-appeal which surrounds us.

The quest for essentially Brazilian artistic expressions occupied many Brazilians during the 1920s and '30s—writers, musicians, painters and sculptors, as well as architects — and it is important to see architecture as but part of this wide-fronted stream of development. Architecture cannot be viewed in isolation from other cultural manifestations. During this period in which aims and sources of inspiration were shared there grew a unique and profound sympathy and understanding between the different visual arts — a sympathy and understanding that must surely underly any really fruitful collaboration between artists of differing disciplines. In the present day European situation in which the architect and the painter, the painter and the sculptor, are so

separated and apart it is Alice-like to merely cry for a synthesis between architecture and the other visual arts; rather, I submit, we must each of us work to establish the conditions out of which a sincere and meaningful synthesis can grow and develop.

The integration of all the visual arts is a well-known feature of modern architecture in Brazil and mere words can do little but catalogue a few examples—the great ceramic mural by Candido Portinari, bounded by parabolic concrete vaults, which is the entire facade of Oscar Niemeyer's Church of Saint Francis of Assisi at Pampulha; the small vernacular patterns of many beautiful azuleijo panels; the exquisite relationships between the sculpture, painting, ceramics, planting, and the architecture of the splendid Ministry of Education and Health building in Rio de Janeiro. Particular, though necessarily brief, mention must be made of the Brazilian garden and of Roberto Burle Marx — painter and mosaic artist as well as landscape designer—to whom credit must be given for that change in garden design which has ousted French inspired formality in favour of the plants of the jungle and an apparently casual naturalness. Rarely have the relationships between architecture and the garden been more harmonious than in modern Brazil.

Although the best Brazilian work has its origins in careful assessment of the indivisibly related problems of functional space organisation and appropriate structural solutions another basic quality of that work stems from the brilliance with which architects have made fundamental choices of form—choices which have been ultimately determined by the vital imagination and personality of the designer rather than by any technical or pragmatic considerations. In the words of Lucio Costa, again, there has been a way of thinking which "naturally selects only those functional solutions which have an inherent plastic significance." There is a richness and variety of form in no way indicative of departure from the inescapable reality of the problems which present themselves.

The recognition of plastic quality as a fundamental quality of architecture is an urgent question for architects everywhere, and Brazilian architecture is rich in examples deserving of the attention and study of those of us who want to understand the importance of this aspect of our art. Recognition of plastic quality should play a large part in determining the architect's own attitude to his work and, on a broader level, is essential to the acceptance by society of the architect as a creative artist. Many confusions arise in this country from an attitude which sees the architect as being primarily something other than an artist — as a technician, as the man who does the drawings for the bye-law people, and so on—and our architects are themselves, too often, unaware of their importance in the scheme of things as an artist. To say this does not imply any Bohemian or ostrich-like ignorance of the other, many and varied, aspects of the practice of architecture and, I would hasten to add, there need be no inconsistency between professionalism and art. The architect's attitude as an artist must, I believe, colour his whole approach to the problem of creating architecture, and his understanding of what architecture means, and will, also, affect his decisions and reactions in the face of many issues. For instance, many of the Brazilian designers I met were quite unable to equate the personal and creative nature of the architectural task with the really vast private office organisations which are so commonplace in this country. I doubt if the largest private office I came across in Brazil numbered more than about twenty people, and a third of that number were draughtsmen pure and simple. Likewise, there was some degree of suspicion of so-called group practices.

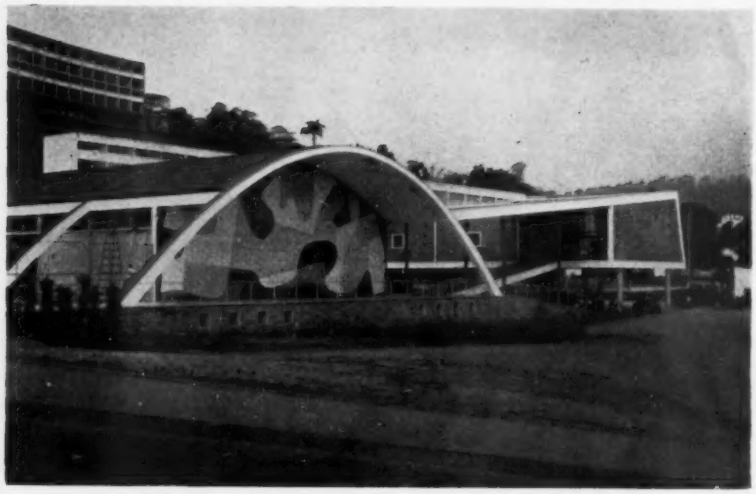
Some two thousand years before Cabral's discovery of Brazil there originated in the Valley of Mexico a sequence of high and distinctive cultures equal to those of ancient Egypt and Asia. Long before the birth of Christ the urban revolution, that is, the change from the small towns of the Archaic period to the great sacred ritual centres of the Classical period, had begun. Plastic quality and the integration of painting, sculpture and colour were born in those distant times as constituent and recurring elements of Mexican architectural expression.

The nineteenth century in Mexico was a story of the Independence and chaos—of "Europeanism" and stylistic eclecticism—but not of creative architecture. The present century has pursued a common architectural course —the iconoclastic Act of Revolution and the inadequate austerities of doctrinaire functionalism — but now, however, Mexican art is once more enjoying a vigour, movement and originality that is reminiscent of its Golden Age. Representative of this rebirth of Mexican inspiration is the great new University complex in Mexico City, initiated and, to all events, completed during the term of office of President Miguel Aleman, a statue to whom is one of the dominant features of the great quadrangle. There are many important aspects of this splendid group of buildings, but I am here only concerned with the important place that mosaics, painting and sculpture have in the whole composition. From high up in any of the several tall buildings the entire scene is one of rich and varied colour, but there is little doubt that the Central Library building dominates the group and is, indeed, one of the most remarkable buildings of this century. The four walls of the ten-storey stack tower, almost unbroken by window openings, are completely covered with mosaics in natural coloured stone which depict the culture of Mexico during the three fundamental periods of its history. The pre-Hispanic era and the Spanish colonial period are represented on the northern and southern walls, and symbols portraying modern culture occupy the shorter remaining walls. At the foot of the building are massive walls of lava stone—the entire site is a 5,000 year old lava bed — with relief carvings directly reminiscent of Mexico's ancient religious art. The building and the designs for the immense mosaic decorations are the work of Juan O'Gorman, a famous Mexican painter and disciple of Diego Rivera as well as architect, who in the 1930's was one of the leaders of an extreme school of functionalist thought.

The Olympic Stadium, designed by Augusto Perez Palacios to seat 110,000 spectators, is, for me, the most satisfying element of the whole University group. In principle it is a great earthworks and the form of the huge, open bowl is in real harmony with the strange volcanic landscape around. The battered faces of the earthen ramparts are faced with rugged lava blocks and Diego Rivera, the most famous contemporary Mexican artist, is carrying out another immense decorative mosaic in coloured stone. The theme is again inspired by styles previous to 1521, and the artist is attempting a relief mosaic technique which, in the Mexican light, is giving great force and power to the simple architectonic mass it adorns.

The pressures of time and space deny further description, but reference must be made to the murals on the Rectoria building which are being carried out by Alfonso Siqueiros, the glass mosaic murals by Chavez Morado on the Faculty of Science, the huge pattern by Francisco Eppens on the Faculty of Medicine, and the beautiful bronze sculpture of Prometheus by Rodrigo Arenas Betancourt which stands poised over playing water in a court adjacent to the Science buildings.

The ancient cities of Teotihuacan and Chichen-Itza were big shows, with their painted buildings and rich ornament, and now Mexican designers have again achieved a huge and magnificent spectacle of great significance. But the cult of external muralism provides no simple formulae or recipe for the introduction of expressive force into modern architectural composition and many new buildings in Mexico City give more than ample evidence of the awful dangers arising from the arbitrary scattering of murals on to this or that convenient blank wall. Even Juan O'Gorman—and remember that he was both architect and muralist for the Central Library—is uneasy about his own achievement. Of his Library build-



The Gymnasium and Primary School, Pedregulho, Rio de Janeiro. Architect: Affonso Reidy.

ing he has this to say — "between its architecture and the mosaics decorating it, there exists no harmonic relation of plastic expression, due to the fact that the library was planned and built in accordance with European architecture of the International Style, whereas the mosaics were planned following the national and regional plastic. It turns out to be a decoration fitted with a Mexican suit on a foreign architectural body." I may say that it did not turn out like that for me, but if O'Gorman has doubts about his own building he must surely have nightmares about many other recent buildings in Mexico City. Facile muralism is running absolute riot in buildings large and small, and the new Ministry of Communications and Public Works, designed by Carlos Lazo, the Executive Director for the University project, achieves a positive peak of incoherence with its quite astonishing welter of applied decoration. Muralism of this kind must represent an effort to win expressive force for modern architecture as desperate and as futile as the playing about with fenestration patterns based on pictorial art and the often pathetic variations on the limited theme of chequer board elevations.

Without leaving Mexico City I met a designer who feels this very strongly and whose work will, I dare to prophecy, very soon become more widely known and respected. Felix Candela, Spanish born architect, engineer and constructor, conveniently serves as a transition from the first to the second part of my paper — to a brief consideration of some of the technical aspects of the work I saw in Latin-America—but he also demonstrates the fallacy of attempting to subdivide the whole wide problem of architecture into separate problems such as the plastic, the technical, and the sociological. Such aspects are wholly and indivisibly interrelated. Candela is concerned with the creation of new architectural forms arising from the rational and logical uses of our new materials. He sees the diagram explaining the reinforced concrete skeleton frame and the opportunities for free planning (well-known to students of Le Corbusier and to readers of "Space, Time and Architecture") as a demonstration of a basic ignorance of the characteristics and proper behaviour of reinforced concrete. Mistaking the mere possibilities of the new material, he says, for its real properties laid a basis for the non - architectural formalism commanding modern composition. Candela sees the twentieth century architectural revolution as a victory against decorative media that long years of misuse had turned obsolete, but one which left the classical skeleton untouched—a classical revolution against classic art. The theories and work of Felix Candela provide material for a serious and worth-while paper in themselves and I must quickly turn to an examination of a few examples of his work. He is wholly absorbed in the potentialities of doubly curved thin concrete shells and, in particular, in the hyperbolic paraboloid and combinations of that geometrical form. The Cosmic Ray Pavilion in the University City, for example, consists of two hyperbolic paraboloidical vaults coupled along a principal parabola. It was a functional requirement of this building that the top part of the shell should have no more mass than 8 psf, which means that the thickness had to be reduced to $\frac{1}{8}$ inch in the upper part of the vault. This was only the fourth of Candela's remarkable designs for thin shells to be built. Perhaps his most interesting current project is the Church of the Milagrosa in Mexico City, the main structure of which was completed when I saw it, where, again, all surfaces are hyperbolic paraboloids, with stresses so low that steel reinforcement is used principaliy to maintain the wet concrete. Although interested in thin shells since his student days Candela admits to being restrained for many years by the mathematical barrier so cunningly laid by the German scientists who developed the method. Today he sees engineers as those who protect the design of shells by a respectable curtain of mystery and higher mathematical abstruseness from the attentions of architects who do not build, but only draw. It is sad to reflect, but true, that one of the obstacles standing between Candela's forms and the main body of architects and students lies in the fact that doubly curved surfaces are almost impossible to represent by drawing on paper, except, of course, the simpler types such as revolution domes.

Like Nervi in Italy, and the late Professor Torroja in Spain, Felix Candela is another unique example of the appreciation and grasp in one brilliant mind of the true and wide range of the aesthetic and structural possibilities of our new architecture.

A survey of the technical content of Brazilian architecture reveals a complex admixture of good and bad qualities, but after some analysis, perhaps, the situation can be more clearly presented, although necessarily in a somewhat over-simplified manner, as one in which there is a general ability to handle the broad issues of structure and the proper integration of structural concepts into architectural design, on the one hand, and a weakness and occasionally slip-shod attitude in the handling of more detailed issues, on the other.

Following an architectural education which generally includes a syllabus of structural theory, calculation and related studies of more weight than is the case in English schools of architecture, the Brazilian architect frequently has a very real understanding of structural principles and forms and a marked ability to talk the language of the engineer. Consequently the collaboration between architect and engineer is often a more fruitful, more natural and smoother business than is the case in many instances in this country. The grace and elegant proportions of structural members—almost always in reinforced concrete because of the great shortage of structural steel—are important factors in the Brazilian aesthetic, and are made possible, largely, by the progressive codes of practice which govern concrete construction. The Brazilian code, based upon earlier German regulations, was issued in 1943 although many of its provisions were common practice before that date. It permits design on the plastic theory on the basis of ultimate loads instead of the method based on working stresses.

From the technical point of view one of the best buildings I saw in Brazil was the School of Architecture now under construction in the new University City at Rio de Janeiro. The whole University project is moving slowly because of economic and other pressures, but, nevertheless, Jorge Moreira—one of the group responsible for the Ministry of Education—and a talented team of young architects are doing a very impressive and thorough job. In this particular building which, in many respects, is a pilot scheme, very great attention is being given to details of design and construction, the selection of materials, and finishes generally. Trial panels of ceramics, floor finishes, colour and the like, as well as such items as built-in window frames of differing materials and sections, are being most closely studied before final decisions are taken. It was most refreshing to visit the building with Moreira and observe, and, indeed, take part in the study and discussion of detail, both technical and aesthetic, because in all too many instances Brazilian buildings have suffered from a lack of detailed consideration and supervision by the architect.

The problems inherent in the existence of a large, poorly paid and unskilled labour force, and in the absence of any standard ranges of building components of consistent quality, are, of course, very great and the whole question of adequate supervision of construction and workmanship is a much more complex one than is the case in Europe. Nevertheless, the architects themselves are, at times, wholly to blame for some of the failures that have resulted. To ignore this shortcoming of some Brazilian work is to do no service to those Brazilian architects who, in the face of so much myopic and superficial appreciation, must sometimes have had cynical doubts of the eye-sight and critical veracity of some of the people who have visited their country and studied its architecture. If, in this brief reference to the need for more detailed consideration on the part of Brazilian architects, the name of Oscar Niemeyer seems to be unduly stressed it is because he is undoubtedly a very great architect, who has by no means reached the peak of his achievement, and it is, therefore, doubly painful to see his work suffering from ill-considered detail. Furthermore, if such criticism be true of Niemeyer it serves to underline my implication that the practice of mediocre detailing is widespread. Some of the buildings in the IVth Centenary Park at Sao Paulo, for instance, are depressing in their technical standards, frequently, it would appear, due to an underestimation of the fact that concrete must expand and contract and that it will crack unless some provision to accommodate the movement is made. The mosaic covered dome, in particular, must surely deteriorate to the point of having to be taken down before very long. The acoustical phenomena which one might readily expect inside such an exhibition building have been corrected in what appears to be a fairly hurried manner, and certainly in a not very architectural manner, by an arrangement of fabrics at the crown of the dome. It is, perhaps, slightly unfair to quote the unfortunate example of some of the buildings by Niemeyer at Pampulha because the whole scope of that ambitious project has come to nought—through no fault of Oscar—and his work has not enjoyed normal maintenance and some of the buildings have been put to uses for which they were not designed. Apart from all that, however, the otherwise beautiful little Church of Saint Francis would still have leaked rather badly, and the tiling and window details of the Yacht Club would inevitably have been the source of trouble. Architects, including Niemeyer, are frankly aware of these flaws in their past performance and I have little doubt that they will go to sufficient trouble to avoid them in the future.

I used the expression "normal maintenance" just now and, perhaps, I might just remark that normal maintenance means not very much maintenance in Brazil. In the Ministry of Education building, which is widely accepted as being still Brazil's best modern building, it is utterly depressing to see small patches within Portinari's great murals where the surface has been crudely levelled with cement following the dislodging of a tile or two.

Mention of Pampulha must pass me on to the third and last section of this sketchy review of some of the work I saw in Latin-America—to an examination of the broader sociological content of that work—because, after all Pampulha was envisaged as a whole area of residential development and not, simply, as a few isolated buildings by Oscar Niemeyer. The project was initiated by Juscelino Kubitschek, recently elected President of Brazil and past mayor of Belo Horizonte, and governor of the state of Minas Gerais, and, perhaps, I may interpose here a brief remark about how much Brazilian architects owe to the enlightened patronage of administrators like Kubitschek and Gustavo Capanemo who, as Minister of Education, was so largely responsible for the Ministry of Education building. It is a great pity that the Pampulha project did not, in the event, materialise because examples of large scale development are difficult to find. The lack of any rational system of overall planning proposals is creating a desperate problem for Brazilian architects, and the great centres of population like Rio, Sao Paulo and Belo Horizonte are expanding at incredible pace in a most chaotic manner. Belo Horizonte has a plan of sorts, but the mere existence of a grid-iron layout is, of course, useless as a means of imposing any sort of visual order. Great streets like the Avenida Presidente Vargas and the Rio Branco in Rio de Jeneiro are being developed with little regard to the design of the street as an entity, and fine buildings such as Niemeyer's Boavista Bank are swamped in a sea of ill-mannered urban chaos.

In judging this aspect of the Brazilian scene we must be at pains to remember the particular stage of political and economic development through which Brazil is passing. Although the architects are painfully aware of the need for broad planning, it is, nevertheless, difficult to see how any really workable system of control can be readily introduced into a society which accepts terrific speculation in land values and some degree of administrative corruption.

In the main the opportunities for Brazilian architects have presented themselves in the sphere of isolated buildings and very little housing for the growing urban working-class, for instance, has been carried out so far. There is no tradition of municipal housing in the country. However, there is some proof of the skill with which we can expect Brazilian architects to meet their new responsibilities, and the almost completed neighbourhood at Pedregulho, developed under the direction of Affonso Reidy, the City Architect of Rio, is an example of urban development of some significance. Later schemes of similar development, either in the early stages of construction or on the drawing board in Reidy's department, are evidence enough that Pedregulho is no more flash in the pan, and Brazil may well yet make contributions in the field of town planning as great as those she has made in the architecture of individual and isolated buildings.

The attitude of great Brazilians like Reidy towards the problems of urban planning is, like their attitude towards architecture, an essentially creative one. Although in this country we have achieved some negative success there is, perhaps, a need for a more widespread realisation that our comprehensive system of legislation and control must not only allow, but must vigorously encourage, a positive creative attitude towards our complex urban problems.

The most interesting and stimulating item of urban planning I came across was the great new central area complex in Caracas, Venezuela — the Centro Simon Bolivar. You see I did go to Venezuela although some of you must have been beginning to doubt the fact. During recent years the government of that country has carried out a very extensive programme of public works. One-third of the entire national budget of that oil-rich country was devoted to the programme in 1953 and 1954. Fine new highways and some exciting bridges by Freysinnet have been constructed; in the true Latin-American

manner a new University City has gradually taken shape over the past eight years; a huge programme of re-housing, school and hospital building has been carried out alongside frankly luxury schemes such as officers' clubs and hotels. Although the sight of so much new building is wonderful and the organisation behind it all very interesting, the actual architectural merit of the work is not, to my mind, particularly outstanding. It is modern alright, but somewhat "fourth-year"——at least the students will understand what I mean—modern, but somewhat moderne.

The Centro Simon Bolivar, however, is a very impressive achievement and I spent several days exploring it. An important four-lane traffic boulevard, surely the holder of the world record for the number of gleaming Cadillacs per linear mile, is depressed through an underpass for about a quarter of a mile, and there is a large underground bus-station and car park. Adjacent to the shopping centre there is a splendid pedestrian plaza on two levels overlooking the city to the mountains beyond. The whole group is dominated by two twenty-eight storey office blocks. The centre is the first instalment of a larger plan of redevelopment for the growing capital. Much of the architectural treatment is pleasant enough, particularly such details as staircases, ceramic grilles, and slit openings which open up views of rich and varied interest, and the choice and use of many beautiful materials has been sensitively handled. The twenty-eight storey blocks, themselves, disappointed me, but for those of us who are interested in the multiple use of land this courageous example of Venezuelan development is an inspiring source of study, guaranteed to make Mr. Kadleigh's mouth water. I am surprised that more publicity has not been given to it.

Perhaps, in conclusion, I may very quickly refer again to the Mexican University, because the site planning is by no means the least interesting aspect of this splendid work. Broadly, the site is divided into three sectors: firstly the area containing the Olympic Stadium and its appoaches which lies to the west of the site and is separated from the remainder of the complex by a motor road running north and south. The stadium is linked, however, to the main area of development by pedestrian accesses under the highway; the second sector is the great quadrange itself and a lesser open space around which are grouped the various faculty buildings; and finally, the south eastern sector of the area is devoted to recreational facilities on a very grand scale and areas for residential hostels, although the provision of the latter is, at the moment, held up. The initial development plan included the provision of an Aula Magna—the central auditorium of the University—and designs were prepared for a great dome to be built near to the Rectoria building and the Central Library. This, however, gave rise to a good deal of controversy and the whole question is, wisely, I think, now being reviewed again. Although the whole complex is very large and vast the provision of small, intimate and individual areas and courts has been most delightfully handled. The limitation of the dimensions of objects and spaces close at hand and the elaboration of the visual framework gives rise to a texture of building in which the spectator makes his own terms with what he sees around him and neither the spaces, the buildings, nor their arrangement are so dominating as to reduce his sense of his own effectiveness.

Mr. President, sir, I must stop. I have said absolutely nothing about so many things—nothing about Brazilian skyscapers that lean and have to be jacked up and hurriedly buttressed by another building, nothing about fancy acoustic "clouds" in the Aula Magna at Caracas University, nothing about the astonishing subsidence which is taking place over the entire area of Mexico City, and nothing about the animal pleasures of sixteen days on the South Atlantic as the start to a holiday. But I wonder, sir, if I may close on a note which is certainly personal, but which, at the same time, I feel sure, echoes a general sentiment on the part of the architectural profession. May I thank the Marley Tile Company for the generosity which made all this possible. This is the second time that I have been fortunate enough to be able to travel and see great architecture because of generosity of firms in the building industry. I feel sure, sir, that we are all immensely gratified to see, in such magnificent gestures as this Scholarship, proof that enlightened industry is not only conscious of its role, but desirous of playing its full part in our task of providing better architecture and better building for our own people in our own country.

Mosaic decoration on block of flats, Caracas, Venezuela, designed by Estaba Toth. (Note : This was not one of the slides shown by Mr. Graham).

Cornell University Scholarships

Cornell University Graduate Division of Architecture and Fine Arts announce the following financial aids are available to qualified students for graduate studies in Architecture, Landscape Architecture, City and Regional Planning, Painting, Sculpture.

Junior Graduate Fellowship — Stipend $1400, plus free tuition and fees. More than one may be awarded.

University Scholarship — Stipend $250, plus free tuition and fees.

Francke Huntington Bosworth Memorial Fellowship—Stipend $1000. For study of Landscape Architecture. Graduates of accredited schools of Architecture or Landscape Architecture may apply.

E. Gorton Davis Memorial Fellowship—Stipend $1000. For study of Landscape Architecture. Graduates of accredited schools of Architecture or Landscape Architecture may apply.

Tuition Scholarships—Value, free tuition. A number of awards may be made.

Assistantships—Stipend $1025, plus free tuition and fees. Several awards may be made.

Applications will be received until February 17, 1956. Requests for additional information and application forms should be addressed to Dean Thomas W. Mackesey, College of Architecture, Cornell University, Ithaca, N.Y., U.S.A.

NEWS

International Competition Open

The Government of New South Wales invites architects to submit designs in competition for Australia's first Opera House, to be built on Benelong Point, a spit of land in Sydney Harbour. The opera house is to seat 3,500 in the main auditorium and to include an intimate theatre for 1,200 and restaurant. The competition has been approved, we understand, by the International Union of Architects.

Premiums: 1st—£A5,000 (£4,250); 2nd—£A2,000; 3rd—£A1,000.

Assessors: Dr. Leslie Martin, F.R.I.B.A.; Professor Henry Ashworth, F.R.I.B.A., F.R.A.I.A., Dean of the Faculty of Architecture, Sydney University; Mr. Cobden Parkes, F.R.I.B.A., F.R.A.I.A., Govt. Architect, N.S.W.; Mr. Eero Saarinen, A.I.A., of Michigan, U.S.A. At present the only way of entering is to write for a form to The Secretary and Executive Officer, Opera House Committee, c/o Dept. of Local Government, Bridge and Phillip Streets, Sydney, Australia. When the applicant receives the form he must send it back with £A10 registration fee to Sydney, where it must arrive by 15 March. The competition closes on 31 December.

The Agent General for N.S.W. is Mr. F. P. Buckley. Tel.: Trafalgar 7477.

Ten Years of British Architecture

An exhibition, "Ten Years of British Architecture '45 to '55", is on view at the Arts Council Gallery from February 4th to March 7th. It is divided into a number of sections devoted to Schools, Housing, the New Towns, Industry, Commerce, Transport, Health Services and Private Houses. Owing to its strictly limited size, it only attempts to show in photographs a few buildings in each section, rather than attempt a comprehensive survey of the post-war decade. The buildings were selected by a committee consisting of the Hon. Lionel Brett, Mr. R. Furneaux Jordan, Mr. J. M. Richards, Mr. Peter Shepheard and Mr. John Summerson. Their choice, whilst rigidly selective, reflects a unity and conviction of view and attempts to assess the main line of development in the post-war years. It has stressed the more progressive ideas of this period which in their turn, in their estimation, will influence the architecture of the future. Mr. John Summerson has written the catalogue which provides a reasoned appraisal of these new tendencies, and should make the exhibition of interest both to the layman and to the student. The exhibition has been designed by Mr. Trevor Dannatt, and will be shown at other places in England until the end of the year, when it will be circulated overseas by the British Council.

The Exhibition will be open Mon., Wed., Fri., Sat. 10-6, Tues., Thurs. 10-8. Admission 1/-.

Russian Architecture and Building 1955

Two members of the delegation who visited Russia last year—Mr. J. H. Forshaw, Chief Architect to the Ministry of Housing and Local Government and to the Ministry of Health, and Mr. R. C. Bevan, Senior Principal Scientific Officer of the Building Research Station — are to give a talk on the impressions they received during their Russian tour. The talk, which will be illustrated, will deal with Soviet methods of industrial and domestic building and will be given at the Royal Institute of British Architects, on Tuesday, February 21st, at 6 p.m. Professor Basil Spence, Vice President, R.I.B.A., will be in the Chair.

Board of Building Education

At its second meeting in January this year the Board of Building Education decided to appoint an independent Chairman. It was felt that the wide field of building education demanded such leadership and guidance as could only come from someone having extensive knowledge of technical education and of the educational needs of industry, especially of the building industry.

A Committee called to consider this appointment was unanimous in its recommendation that Sir Graham Savage, C.B., be invited to become Chairman of the Board, and it is with pleasure that the Board announces his acceptance of this most important office.

Sir Graham has had a distinguished career in the educational world. After holding tutorial appointments in this country, Canada and Egypt, he was District Inspector to the Board of Education from 1919 to 1927. In 1932 he was appointed Chief Inspector of Technical Schools and Colleges, and was Senior Chief Inspector from 1933 to 1940. He held the appointment of Chief Education Officer to the London County Council from 1940 to 1951.

Since 1951 Sir Graham has been Deputy Chairman of the Building Apprentices Training Council, after being Chairman of its Education and Welfare Committee from its beginning in 1942.

Under Sir Graham's chairmanship the Board looks forward to a term of successful activity, which, it is hoped, will be of lasting benefit to the industry as a whole.

F.L.W. and I.A.A.S.

The Incorporated Association of Architects and Surveyors have announced that Mr. Frank Lloyd Wright has been made an honorary member of the Association. This news is a direct development of a meeting between Mr. Wright and the President of the I.A.A.S. Lt. Col. A. E. Henson, T.D., F.R.I.B.A., in October last during a tour which Colonel Henson made in the U.S.

Mr. Wright's formal acceptance of the invitation to become an I.A.A.S. honorary member was expressed in a letter which the President recently received from America.

To mark the occasion the Association has made a presentation to Frank Lloyd Wright of an illuminated scroll which records his outstanding contribution, both as practitioner and teacher, to the advancement of modern architecture.

APPOINTMENT

Mr. J. W. Pope-Henessy, keeper of the Department of Architecture and Sculpture in the Victoria and Albert Museum has been elected Slade Professor of Fine Arts at Oxford.

COMING EVENTS

The Housing Centre Trust

February 14 at 1.15 p.m. "Requisitioned Houses Act". Speaker: M. F. B. Bell, Principal Regional Officer, Ministry of Housing and Local Government. At 13 Suffolk Street, S.W.1.

The Incorporated Association of Architects and Surveyors

February 14 at 7 p.m. Incorporated Association of Architects and Surveyors (Junior Members' Organisation) —Lecture on "The Law of Building Contracts", by F. J. Meekins, F.I.A.S., F.I.Arb., at 29 Belgrave Square, S.W.1.

The Architectural Association

February 15 at 6.15 p.m. Informal illustrated talk, "The Mosaics of Ravenna", by E. A. Remnant. At 34 Bedford Square, W.1.

The Faculty of Architects and Surveyors

February 16 at 7 p.m. The First Annual Dinner of the London Branch will be held at "The Crown", Brewer Street, W.1. G. F. Frost, A.F.S., will read a paper on "Inns and Taverns".

Institute of Landscape Architects

February 16 at 6.15 p.m. Symposium on 'Subtopia'. Speakers: Sylvia Crowe, Ian Nairn, James Adams, J. K. Boynton. At the Housing Centre, 13 Suffolk Street, S.W.1.

Society of Chemical Industry

February 16 at 6 p.m. "Rubberised Bituminous Materials and Their Use in Road Construction", by W. D. Parker and W. D. C. Walker, Expandite Ltd. In the Lecture Hall of the Junior Institution of Engineers, Pepys House, 14 Rochester Row, S.W.1.

A Pre-tensioning Investigation

undertaken by A. K. TERRIS, B.Sc., M.I.C.E., Chief Civil Engineer, Eastern Region, British Railways

PRE-TENSIONING requires a good bond to avoid any possibility of slip of the tensioned steel. This was the reason why, originally, only piano wire of 2mm dia. was considered suitable by Hoyer some 15 years ago. However, smooth British wire 0.2in dia. has been successfully used for pre-tensioning for more than 10 years. The surface conditions of smooth wire 0.2in are quite satisfactory to ensure sufficient bond but they may be further improved by the provision of indentations. There is no doubt that the bond resistance is increased if wire of smaller diameter is used, but there is no advantage in the use of many such wires, if larger sizes ensure satisfactory bond. The latter need less labour for placing and tensioning and allow a larger spacing between the individual wires and thus the use of larger aggregates which results in greater concrete strength.

This advantage of using fewer pre-tensioned wires in the larger pre-stressed beams induced the Civil Engineer's Department B.R. E.R. to carry out special tests to investigate the applicability of smooth wire of 0.276in dia. for pre-tensioning. Messrs. Richard Johnson & Nephew, the makers of the wire, supplied the material and Anglian Building Products Ltd., co-operated in these investigations. They manufactured the beams and placed their factory at the disposal of British Railways and thus helped to a great extent in the valuable results described in the following paragraphs.

A first series of tests was carried out in the Summer of 1952, as reported briefly in the Supplement of C112 "The Use of High Strength Steel in ordinary Reinforced and Pre-stressed Concrete Beams" which appeared in the Final Report (1953) of the Fourth Congress, Cambridge, of the International Association for Bridge and Structural Engineering. These static tests of 1952 already proved the suitability, from the point of view of bond, of smooth 0.276in wire for pre-tensioning in co-operation with high strength concrete, as generally used in first class concrete works.

In 1953-54 further static and fatigue tests were carried out jointly by the Civil Engineer's Department, Eastern Region, and the Railway Research Department at Derby on the beams manufactured by Anglian Buildings Products Ltd., at Lenwade.

In the first tests of 1952, 6 types of beams were tested, having lengths which varied between 10ft 6in and 21ft 6in with two central point loads 3ft 6in apart, and the beams were loaded for three different spans of 9ft 6in, 13ft 6in and 19ft 6in. All the beams had a rectangular cross section of 8in width and 12½in depth and this was adopted because moulds of that size were already in being at Lenwade (see cross sections, Fig. 1).

Six tensioned bottom wires and two tensioned top wires, 0.276in dia. were provided in all specimens: some of them had additional non-tensioned wires placed in twin twisted pairs. The percentage of reinforcement was 0.4 per cent with regard to the tensioned wires, and 1.0 per cent and 1.3 per cent in the specimens in which non-tensioned wires were added.

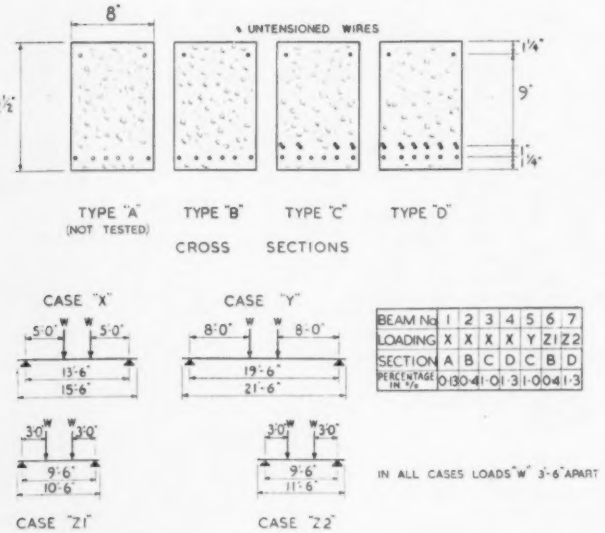
The beams were manufactured without stirrups and in those specimens with a high percentage of reinforcement early shear failure took place which gave an opportunity to study, also, the behaviour due to shear. The specimens which contained tensioned wires only, showed a satisfactory bond of the wire not only for the length of 15ft 6in (span 13ft 6in) but also for so short a length of 10ft 6in (span 9ft 6in).

In the longer beam (B2) the actual failure load appreciably exceeded the load calculated for the maximum steel force based on the strength of 226,000 p.s.i. (101 tons/in 2). balanced by a rectangular concrete stress block corresponding to a prism strength of 6,000 p.s.i.

In the shorter beam (B6) a combined shear and bending failure took place due to the increased shear stresses, nevertheless no slip of the wire occurred and the actual failure load was in accordance with the calculated value.

Of the beams having a larger percentage (1 per cent) only one of 19ft 6in span (B5) may be mentioned. In this case combined shear and bending failure occurred at a load which was only 90 per cent of the calculated maximum, but slip between wire and concrete was not observed.

Further static tests were carried out in 1953 when a beam was tested in which 6 wires were tensioned and 6 single wires were non-tensioned. In



BEAM No.	1	2	3	4	5	6	7
LOADING	X	X	X	X	Y	Z1	Z2
SECTION	A	B	C	D	C	B	D
PERCENTAGE IN %	0·13	0·41	0·31	1·00	4	1·3	

TEST LOADING ARRANGEMENTS

Fig 1

Programme of tests on pre-stressed concrete beams, first investigations on the use of pre-tensioned wires of 0.276 in dia. with a minimum strength of 95 ton per sq in.

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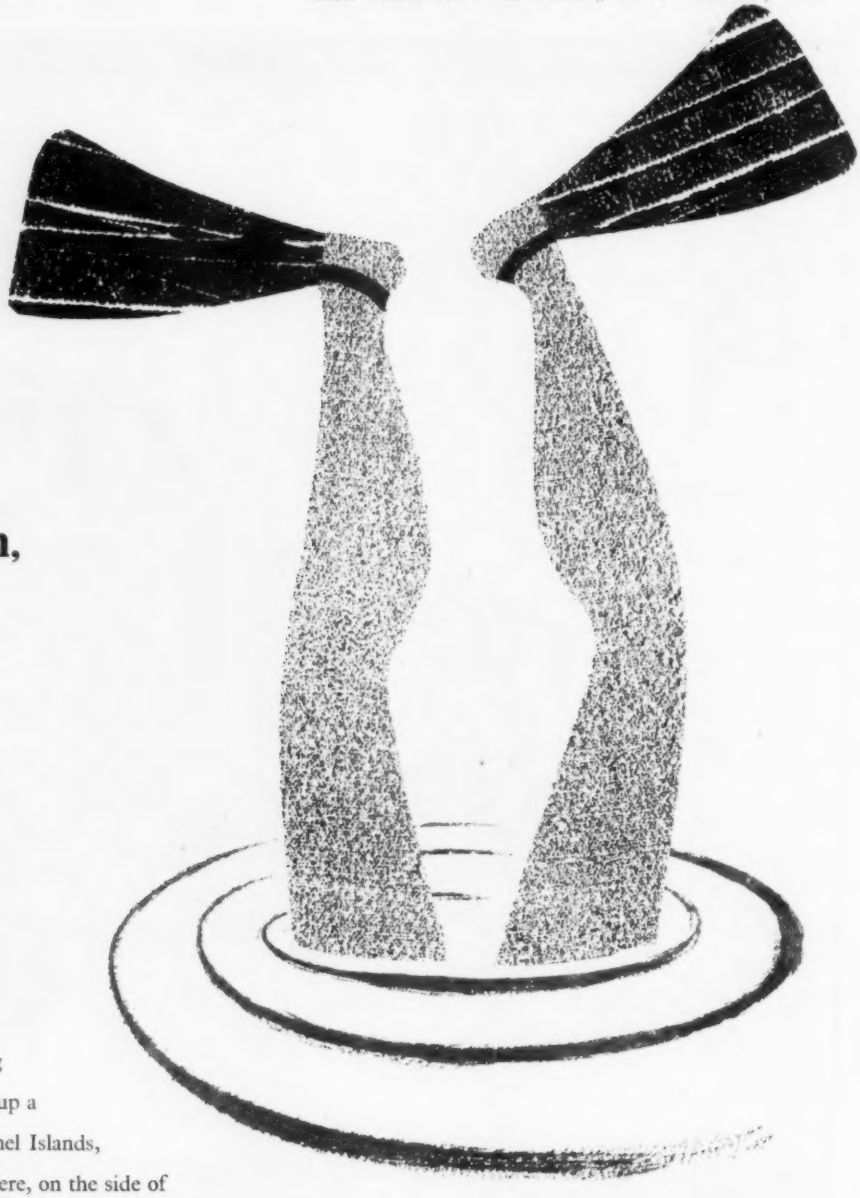
ADA16

G

"I'm going down," said the frogman, "to look at our walls"



There are more ways of inspecting a wall surface than that of climbing up a ladder. At a place in the Channel Islands, you dive into 12 feet of water. There, on the side of a certain swimming pool, and very much against our wishes, you will find Pammastic—doing fine. It is not, of course, designed for life underwater. But this happy misuse provides a dramatic demonstration of a point that deserves publicity—*Pammastic is the plastic emulsion paint that can be used outside a building as well as inside.* Suitable for most surfaces, it needs no primer or undercoating, and dries in an hour. Its fine matt surface can be washed down and *scrubbed* clean repeatedly. Further information about the remarkable properties of Pammastic—and its notable complementaries, Pammel (the luxury gloss enamel), Pammelette (the superfine eggshell enamel) and Pammatt (the superfine flat enamel)—is available on request.

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this case shear failure was avoided by the provision of special stirrups, but apparently slip of the non-tensioned wires took place and plain straight untensioned 0.276in dia. wires are not recommended. It may, however, be concluded that smooth tensioned 0.276in wire spaced as closely as 1¼in will ensure sufficient bond resistance in concrete of a prism strength of 6,000 p.s.i.

It has been ascertained by many tests that non-tensioned pairs of twisted wires 0.2in ensure satisfactory bond resistance; this appears to be the case also with wire 0.276in dia. although it has not yet been conclusively proved, though the outcome is likely to be favourable.

Whilst the static tests showed already the suitability of pre-tensioned 0.276in bonded wire, fatigue tests carried out in the Summer of 1954 indicated the extraordinary resistance of such pre-stressed beams. All the beams had a length of 15ft 6in and to two beams 1,000,000 repetitions of loading were applied between loads corresponding to a compressive stress of 10 p.s.i. and a nominal tensile of 600 p.s.i. Previously the beams were deliberately loaded until cracks had developed. On removal of the load the fine cracks became entirely invisible after completion of the fatigue tests. In subsequent static tests the wires fractured under the maximum calculated load.

In one further test one million repetitions were carried out as before, but in a non-cracked state. Afterwards nearly 9 million repetitions were applied in a cracked state. The lower limit loading corresponded to a compressive stress of 270 p.s.i. and the upper limit to a nominal tensile stress gradually increasing from 650 to 1,270 p.s.i. when the load corresponded to two-thirds of that at which the maximum was obtained in a static loading test by fracture of the wire. The cracks became entirely invisible at zero stress up to and including the eight millionth repetition. A detailed report of these tests will be published later by the Commission.

Thus these tests have conclusively proved the suitability of 0.276in wire for pre-tensioning, save only for the qualification about single untensioned wires and suitable minimum spacing.

It must be pointed out that smooth wire was employed and the condition will be improved if indented wire is used.

In conclusion acknowledgements are reiterated of the help received in the manufacture of the tests specimens by Anglian Building Products Limited and Messrs. Johnson & Nephew. The first mentioned firm undertook the static tests at their works directed by the B.T.C. staff.

The arrangements were all made under the direction of Mr. J. I. Campbell, M.I.C.E., Chief Civil Engineer, British Railways, Eastern Region, until January 26, 1955.

Fig. 2. *Arrangement of static tests beam B6 at Anglian Building Products Ltd. Lenwade, 1952*

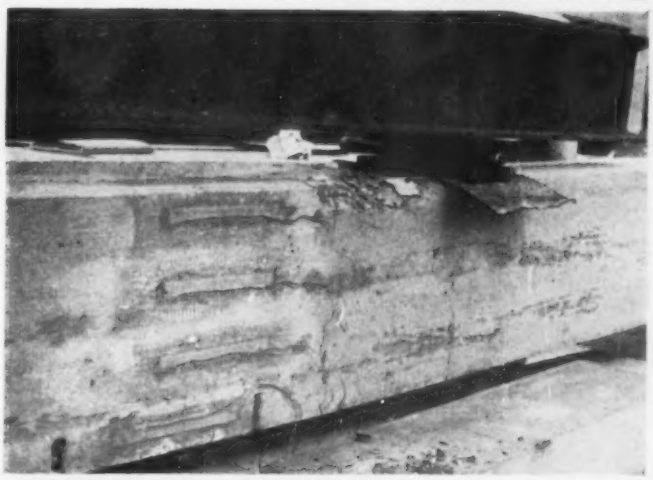


Fig. 3. *Cracks under loading in beam B5*

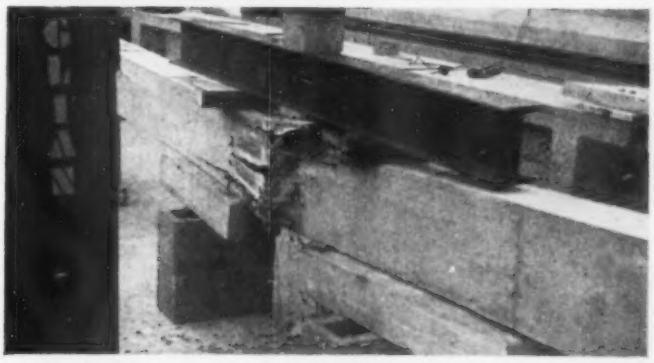


Fig. 4. *Failure of beam B5*

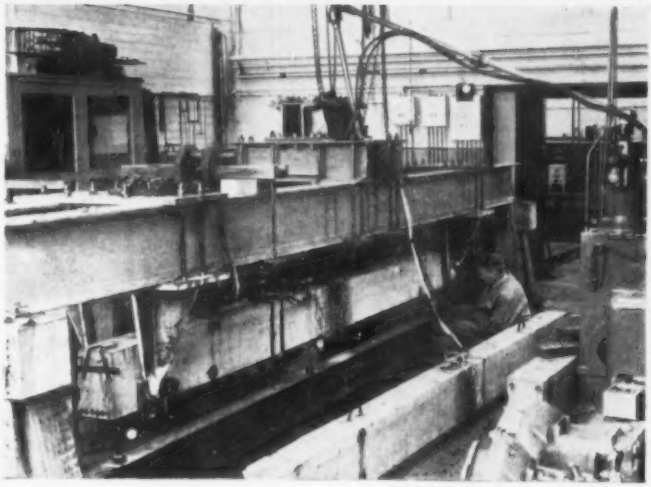
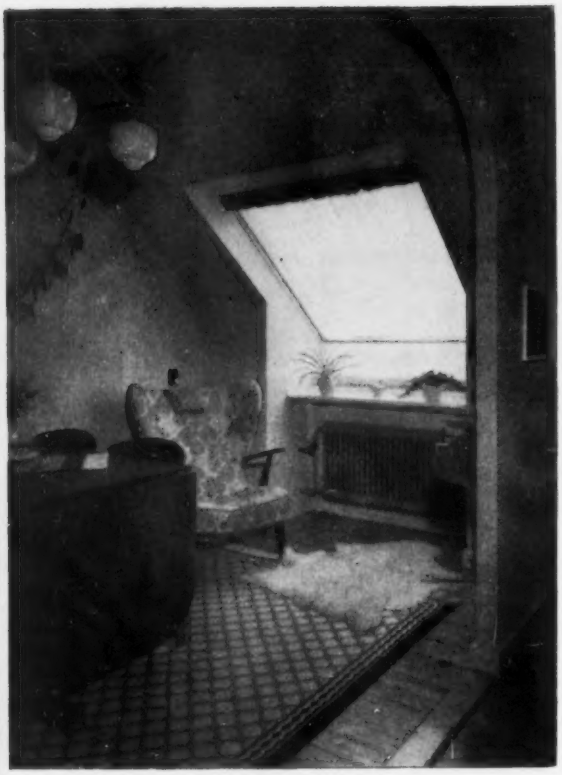


Fig. 5. *The Amsler Fatigue machine of the Railway Research Department, Derby, with a beam under loading*



Interior

Exterior

A New Double-Glazed Rooflight

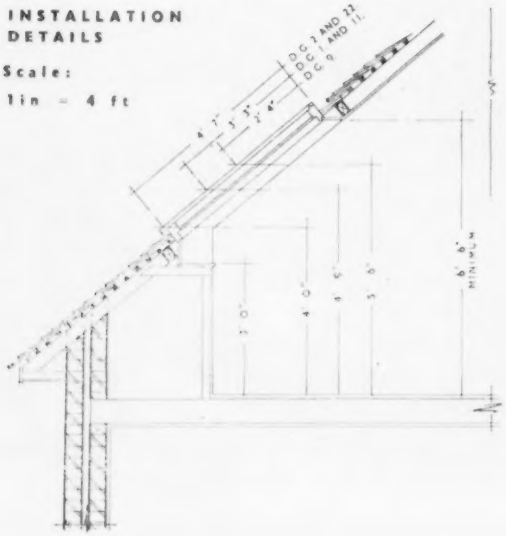
A NEW double glazed roof light which is horizontally pivot hung is the latest piece of Swedish design to reach this country. One of the principal advantages of this particular window, apart from its insulating characteristics, is that it is mass-produced in five sizes. The smallest size, which gives a just under 2½ sq ft glazed opening, costs just over £9: the largest, which gives 17½ sq ft in two sashes, costs under £23. It is made from first grade Swedish pine which is given a priming coat before it is dispatched. All external timber is supplied with zinc profiles and all furniture is rust-proof; screws are brass with lead cups. The patent pivot hinge enables the sashes to be rotated through approximately 135° so that the external glass surface is brought into the room for cleaning; in this position the sashes can be separated for internal cleaning. Full details can be obtained from The Velux Company Limited, 167 Victoria Street, London, S.W.1. Telephone : Victoria 3570.

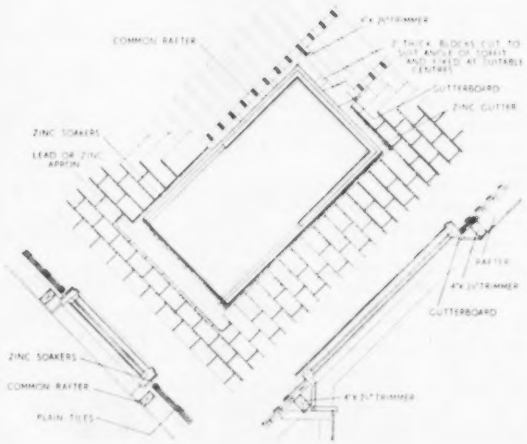
135 degree Pivot Hinge

INSTALLATION DETAILS

Scale:

1in = 4 ft





CRITTALL UNIVERSAL CASEMENTS

This illustration shows the offices of the British Insulated Callender's Construction Co. Ltd., Leicester Square, London (*Architects: Messrs. Morris de Metz & Theo H. Birks* F./F.R.I.B.A.) which are fitted with CRITTALL PURPOSE-MADE UNIVERSAL CASEMENTS POSITIVELY RUSTPROOFED by the hot-dip galvanizing process.

The word "Service" to Crittalls, is well-defined. It means a readiness to put at your command all the accumulated experience of 60 years' work in the design and manufacture of windows—plus the new knowledge which comes from unremitting day-to-day research. A call to Crittalls will harness this experience to any new window problems which may now be in front of you and you can be assured of close attention to every detail of design, manufacture, delivery and inspection after installation.

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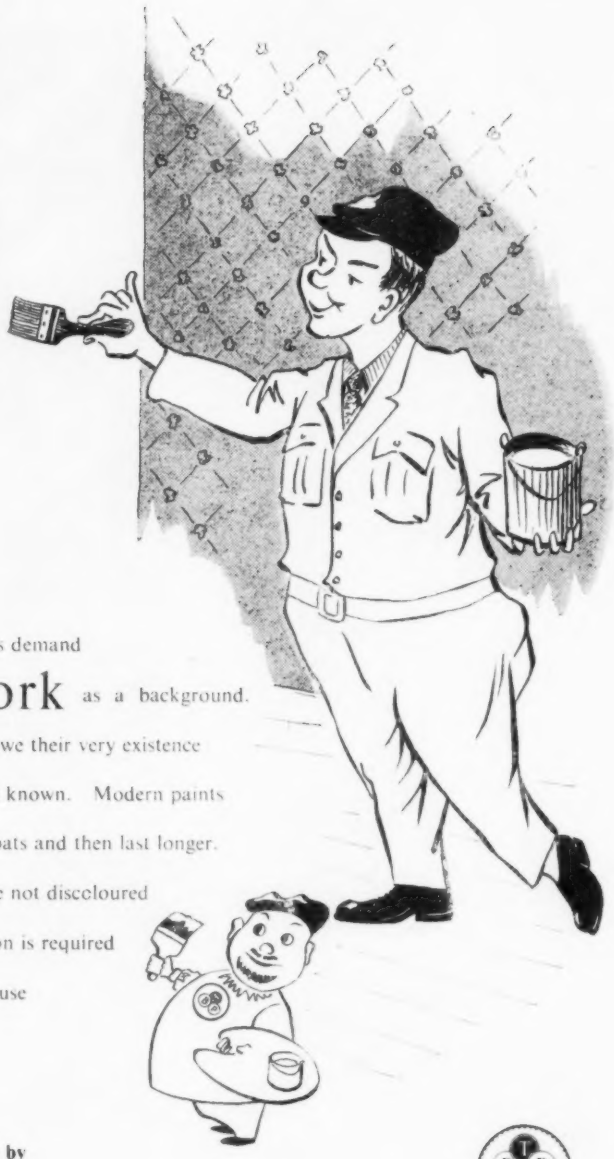

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B.S. Colour Cards

WE have been hearing rumours of the issue of a new B.S. colour card for several years. Some 12 months ago the range of colours was displayed at various places for comment and at Olympia some advance indication of its final contents was given by the Building Research Station on its exhibition stand but the date of its availability then remained unknown. It has now been issued as B.S.2660 and can be obtained from the B.S.I. price 7/6d.

As it is much more representative of the colours wanted and in use for building purposes than the earlier B.S. card it should be much more widely used and it is to be hoped that paints complying with it will be readily obtainable from general stocks, which does not seem to have been the case with those shown on B.S.381C.

The range given on the new card is good and should satisfy all ordinary needs of architects, decorators and the general public who are, in these days, large buyers of paint. The range covers 101 colours, which is a few less than the two existing B.S. cards 381C and 1572 taken together but these two covered a wider field than the new card, which is essentially for building and decoration paints and thus excludes colours intended for special and identification purposes. Presumably because of these other uses B.S.381C is to continue for at least another year, after which one can but assume that it will be reissued as a range confined to special uses. Fifteen of the B.S.381C colours are in fact included in the new range and are listed on the back of the wallet containing the new cards, with the related references in both series. B.S.1572 'Colours for flat finishes walls' is completely superseded by the new range and is withdrawn. Incidentally it is not clear from the reading matter printed on the wallet whether the new card covers distempers but as these are a form of paint and many of the colours are marked as applicable to matt finishes, it would seem reasonable to assume that it covers them. Moreover quite a number of the pale pastel shades would seem to be suitable only for materials of the distemper and similar types of flat finishes. It should be recalled that B.S.1572 equally avoided a direct reference to distemper but was a range of colours known to cover this type of material and various wall finishing paints.

The colours given on the new card cover a range which should find general acceptance since they range over the full sphere from strong to pale shades. As the decoration of buildings seems to be, at least to a measure, a 'fashion' trade no doubt new thinking will be necessary in some five years time; it is to be hoped however that arrangements for the publication of the next issue will not take five years as this series appears to have taken as if it does the B.S.I. committee ought to have started work already in anticipation of the 1960 issue. The range seems to have been strongly influenced by the colour theories that went into the preparation of the Ministry of Education 'Archrome' range issued several years ago in connection with the school building programme. The selection of the colours for this B.S. card was made through the collaboration of the R.I.B.A. and the paint manufacturing industry represented by its three trade associations. Various Government and other major buyers have also contributed to the selection.

It is understood that, when the proposed range was displayed for comment in accordance with the usual B.S.I. custom, few observations were received indicating a need for alternative colours. As the range has been agreed by a Committee and the Council of the R.I.B.A. it seems probable that a large part of the membership of the Institute will not only accept but will use the range now that it is available and, since a number of the larger users have collaborated also, it should encourage the paint makers to provide paints to the colours in the range. The majority of others who specify paint can probably be relied upon to select from the range if the paint manufacturers offer as their own ranges the B.S. range or a selection from it. It seems likely that a large number of manufacturers will feel the range is too large for their normal manufacture and stocking purposes and will issue their own colour cards based on a selection of colours from the B.S. range.

As the card has been prepared through the consultative machinery of B.S.I. it may be assumed that the colours selected, if the given limitations to suitable types of paints are observed, will provide paints which are reasonably resistant to exposure to light and weather and will not be unduly expensive within each quality of paint. Care seems to have been taken to include a number of colours which are perhaps unlikely to be widely used by architects but which seem to appeal to the general public. It is to be hoped that the paint makers will let the public know which of their products have colours complying with the B.S. by showing the B.S. number and references on their lists and tins.

In regard to the range as illustrated by the colour tabs it seems a little regrettable that at least black and perhaps also white have not been shown since both of these are liable to considerable variation between the products of the various manufacturers. There is most unfortunate printing error on Card 7, which is in fact a card of blues, whereas it is labelled green, which seems to have escaped the proof readers until the end and this has involved the issue of a corrigendum with the folder.

The colour range is given on ten separate cards, each about 4¼ in wide by 8¼ in high which are enclosed in a form of pocket in a wallet on which is printed certain general information. The colours are divided into groups which are numbered 0 to 9. Card 0 contains the strong colours and card 9 contains the greys. The interim cards show the paler colours on the left and the stronger ones on the right in eight hue groups, Card 1 shows the reds, Cards 2 and 3 the yellow-reds, Card 4 the yellows, Card 5 the green-yellows, Card 6 the greens, Card 7 the blue-greens and blues and Card 8 shows the purple-blues and red-purples. The cards are printed with the colours on the vertical edges generally arranged in each group from light to dark from top to bottom of the card. Some spaces are left between colours in order to maintain an approximate regularity in this gradation. The colour tabs have been printed right to the edge of the card, without any white paper adjoining, which permits any colour in one group to be placed alongside a colour in another group, to facilitate comparison. This is an excellent arrangement to overcome the difficulty experienced in previous B.S. colour cards and in fact in all colour cards or books of colour normally distributed to the building industry. Adjoining each colour is given the reference number for ordering each colour and guidance on the main types of finish for which each colour is suitable. All the colour tabs are given in a semi-gloss finish but it will be found that if they are wetted a reasonably good idea can be obtained as to what their appearance would be in a gloss finish.

It is gratifying to know that unlike B.S.381C and 1572 and most paint manufacturers' colour cards, the colours have very wisely not been given names and depend entirely on number references. In the past the names used have frequently conveyed to many people an idea of a colour

quite different from that shown and in any case the names have often been quite absurd. To avoid confusion with the majority of reference numbers in trade use and with those of the earlier British Standards, each number has its individual card reference as a prefix to a three digit reference so that all the specification or order needs to state is 'colour to B.S.2660, 6-072' and of this, if there is a suitable reference to all the colours being to B.S.2660, only the four last digits are needed. Black and white have had reference numbers allocated to them although they have no colour tabs.

The colour card is an excellent production whose form and presentation are admirable. Very considerable care has been taken to ensure precise reproduction of the colours and to ensure uniformity. They have been very carefully checked to match deposited samples and have been tested for light fastness and resistance to deterioration and yellowing in the absence of light. As with the previous colour cards it is proposed to issue large specimens of each colour, 5 in. x 2 in., to facilitate colour matching.

Having established the colours it would seem to be desirable that the B.S.I. issues another B.S., or an addendum to this card, indicating the acceptable limits of colour deviation permitted from the colours given on the card as experience indicates that commercially these deviations are often quite considerable and vary from batch to batch and even tin to tin. Perhaps something of this nature can be included in the supplement which is to be issued later.

It seems also very desirable that a Code of Practice for colour should be prepared to show how properly to use the standard colours. Such information should not be in publications of the M. of E. or B.R.S. but in the B.S. Code of Practice series.

The latter supplement is to give the colorimetric values expressed in terms of the system laid down by the International Commission of Illumination and the values of the total reflectance (luminance factor) which can be regarded as a quantitive expression of the 'lightness'. The value of this supplement to the average user is undoubtedly extremely small and it seems very wise that this information should not have been included on the colour cards themselves. The facilities for checking colorimetric values by this system seem to be almost non-existent in this country.

The cards give for each colour an approximate reference to the Munsell Color System, for those who may find these of value. The inclusion of these references may have some educative value but one can imagine that in fact there are very few architects who judge or order colours on the basis of this or any colour system. It would be interesting to know how many architects really know much about the Munsell System and how many have copies of the Munsell Color Atlas, which is such an expensive publication in this country. It seems probable that at least 95 per cent of architects select colours merely by looking at colour cards and it is reasonable to assume that few builders, painters or decorators are interested in colour systems and among that large group of purchasers of paints and painting, the general public, few have any interest whatsoever. It may be that in time these references may lead to a greater interest in the scientific application of colour and that in due time a B.S. colour system will be developed, perhaps on the lines of a perfected Munsell System.

There is probably, in the minds of many, some doubts as to the advantages of a standardized range of colours for painting. One architect consulted on this point said quite baldly that it is a waste of time as he is able to get the precise colours he wants, even in pint tins, at normal prices; this may be true but should not be possible as there is no doubt that the manufacture of small quantities of paints of special colours is extremely costly to the producing firms and out of all proportion to the cost of producing large quantities of agreed colours. The advantage of any standard colour range is that the work of specifying colour is simplified, the manufacturers can make in bulk with a reasonable expectation of selling what they make and it is simple to order and re-order any colour from one of a number of sources of supply and obtain material that will be a reasonably close match to what is required.

It is to be hoped that the paint trade, the British Colour Council, Government Departments and all large users will adopt this range of colours and the references given to them and by this means eliminate much confusion which has arisen in the past. It is regrettable that the Government Departments have already found it necessary to issue in advance a colour card giving the colours on this range as it seems probable that there will be differences between the official colour cards (produced by a different method) and the British Standard. It certainly should be quite unnecessary and undesirable that any Government Department or major user should, in the future, issue their own colour card but instead they should rely on the quotation of references to the B.S. colour card.

There is no doubt that those who have contributed to this B.S. publication have not only done a very good job of work but have also made an extremely valuable contribution to the building industry. It is now up to those who use paint to confine themselves, for all normal work, to colours within this range as this action should, in the long run, assist economy.

DUTCH UNCLE.

Truscon Travelling Scholarship

The Trussed Concrete Steel Co. Ltd. of Lower Marsh, London, S.E.1, offer a Travelling Scholarship of £125 to enable an Associate of the Royal Institute of British Architects to undertake a Continental tour of about three weeks' duration. The winner will be accompanied by a member of the company's technical staff awarded a similar scholarship and they will be required jointly to study interesting reinforced concrete work on the Continent of Europe with particular reference to the collaboration between architect and engineer. A joint report will be prepared, the use and copyright of which will remain at the disposal of The Trussed Concrete Steel Co. Ltd. Applicants must be under 35 years of age on April 1, 1956 and must provide evidence of their office experience and of their special interest in the subject of the scholarship, i.e., the use in contemporary architecture of reinforced concrete.

Applications must be submitted by March 12, 1956 to the Secretary, The Trussed Concrete Steel Co. Ltd., Lower Marsh, S.E.1, and must contain the following particulars: (A) Age. (B) Architectural education. (C) Academic qualifications. (D) Present occupation or employment. (E) Evidence of candidate's suitability for appointment to the scholarship. A knowledge of one or more European languages would be of value. (F) The names of two persons to whom reference may be made regarding the candidate's fitness for appointment to the scholarship.

The applications will be considered by a selection Committee consisting of Mr. C. S. White, F.R.I.B.A., Mr. G. Grenfell Baines, A.R.I.B.A., A.M.T.P.I. and a Director of The Trussed Concrete Steel Co. Ltd.

ANNOUNCEMENT

The School of Architecture (University of Durham), King's College, Newcastle upon Tyne is expanding its Library of Manufacturers' Technical Data and samples of Building Materials.

Firms are invited to submit literature and samples.

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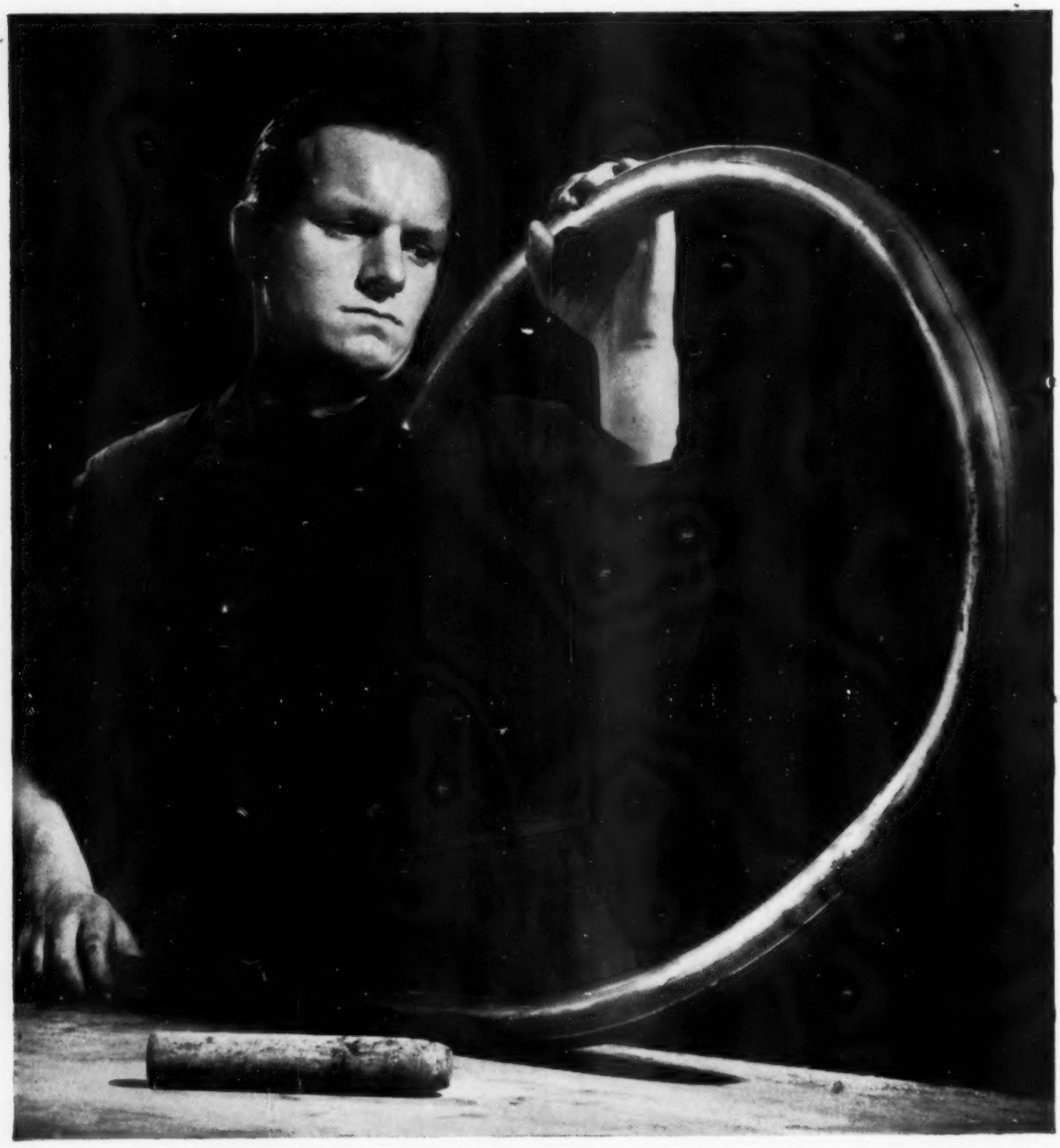

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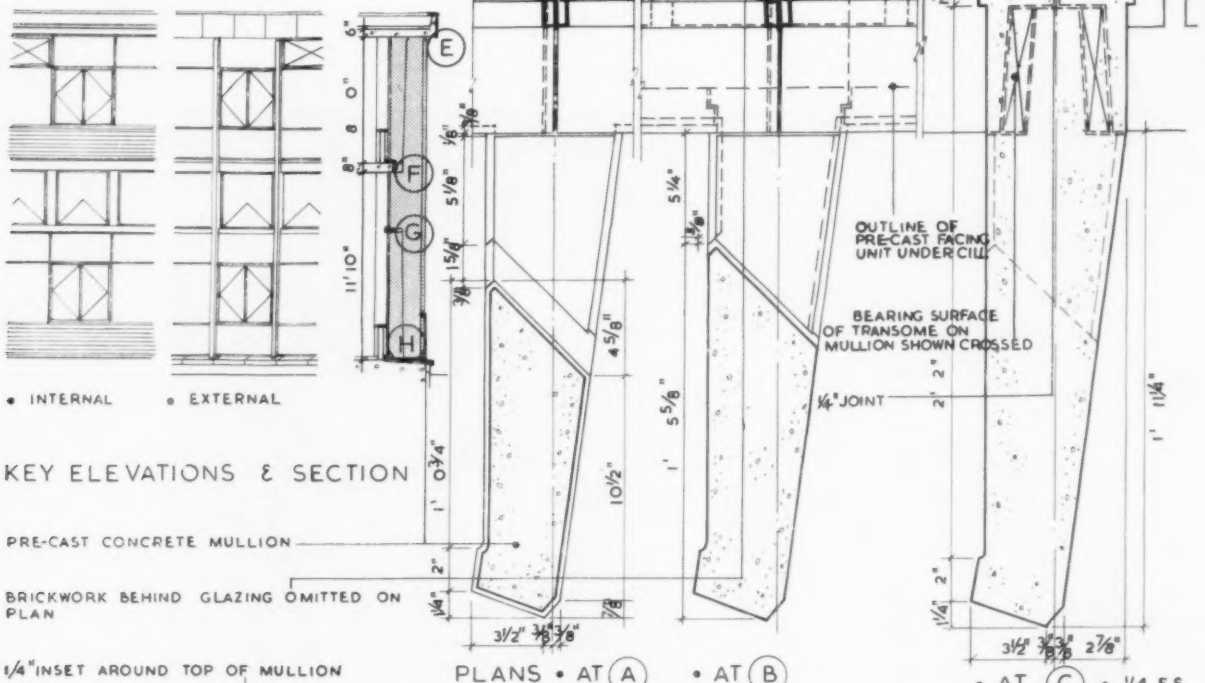


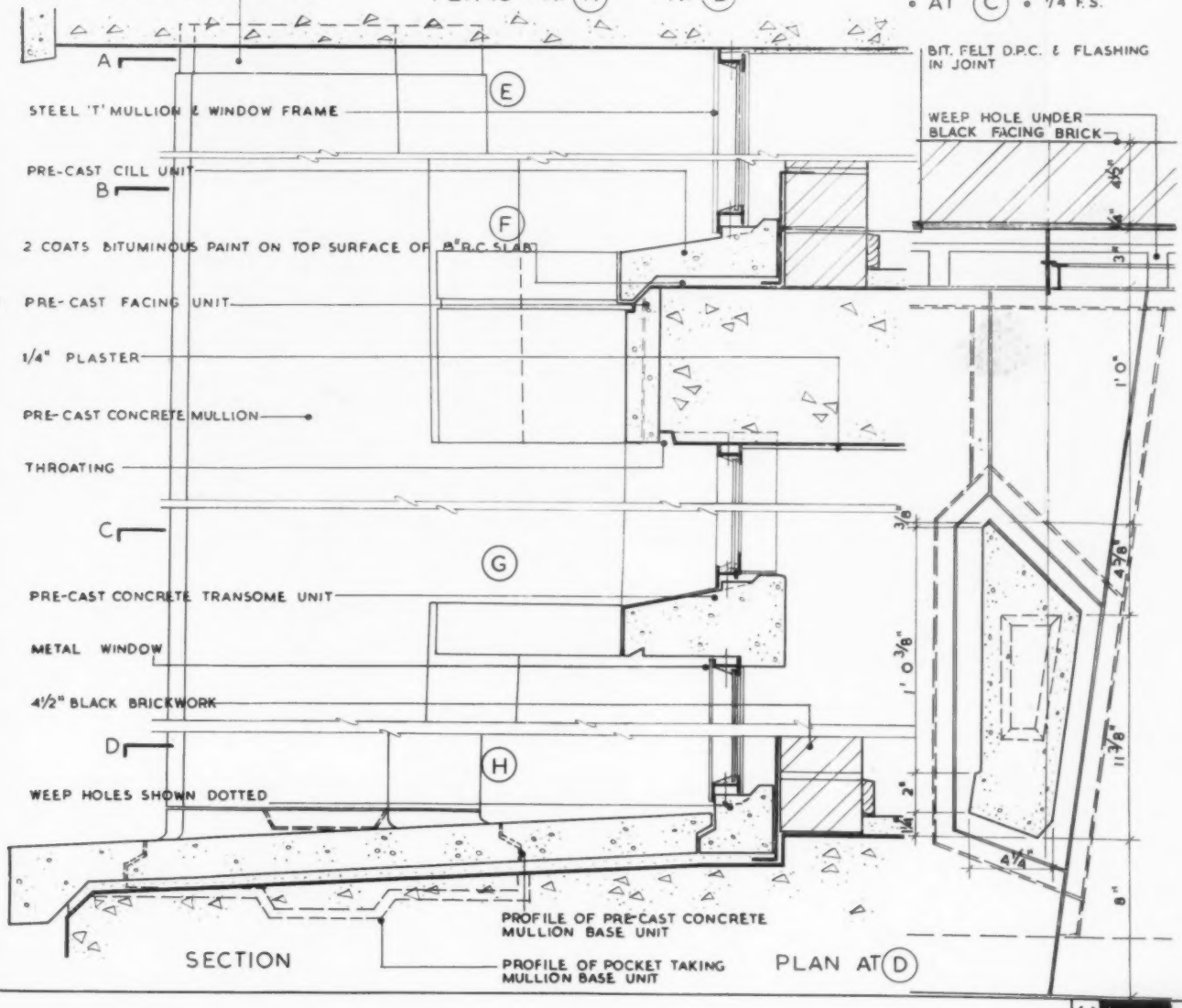
KEY ELEVATIONS & SECTION

PRE-CAST CONCRETE MULLION

BRICKWORK BEHIND GLAZING OMITTED ON PLAN

1/4" INSET AROUND TOP OF MULLION

PLANS • AT (A) • AT (B) • AT (C) • 1/4 F.S.



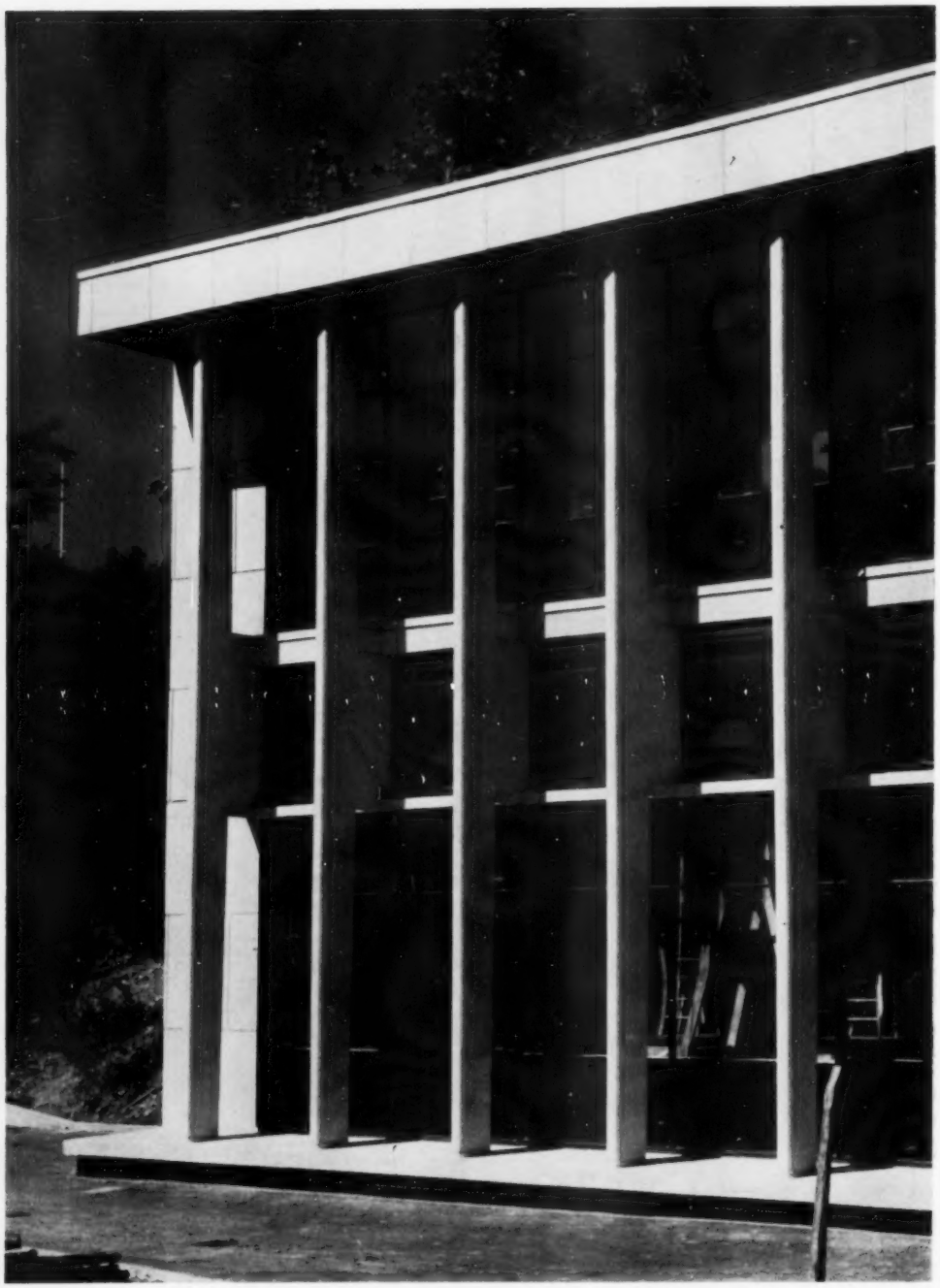
SECTION

PROFILE OF PRE-CAST CONCRETE MULLION BASE UNIT

PROFILE OF POCKET TAKING MULLION BASE UNIT

PLAN AT (D)

CLASSROOM MULLIONS SCHOOL, PADDINGTON • DRAKE & LASDUN



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ARCHITECTS: DRAKE & LASDUN

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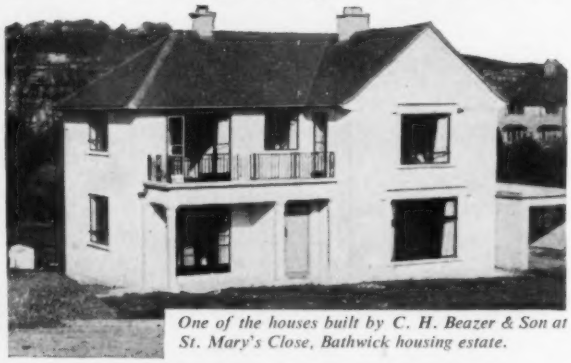

One of the houses built by C. H. Beazer & Son at St. Mary's Close, Bathwick housing estate.

. . . and Electrolux *Refrigerators too!*

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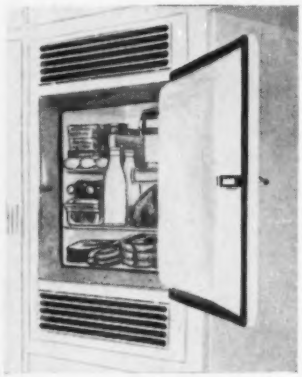

Photo shows M.151 installed at St. Mary's Close Estate. The refrigerator is built-in at waist height for convenience.

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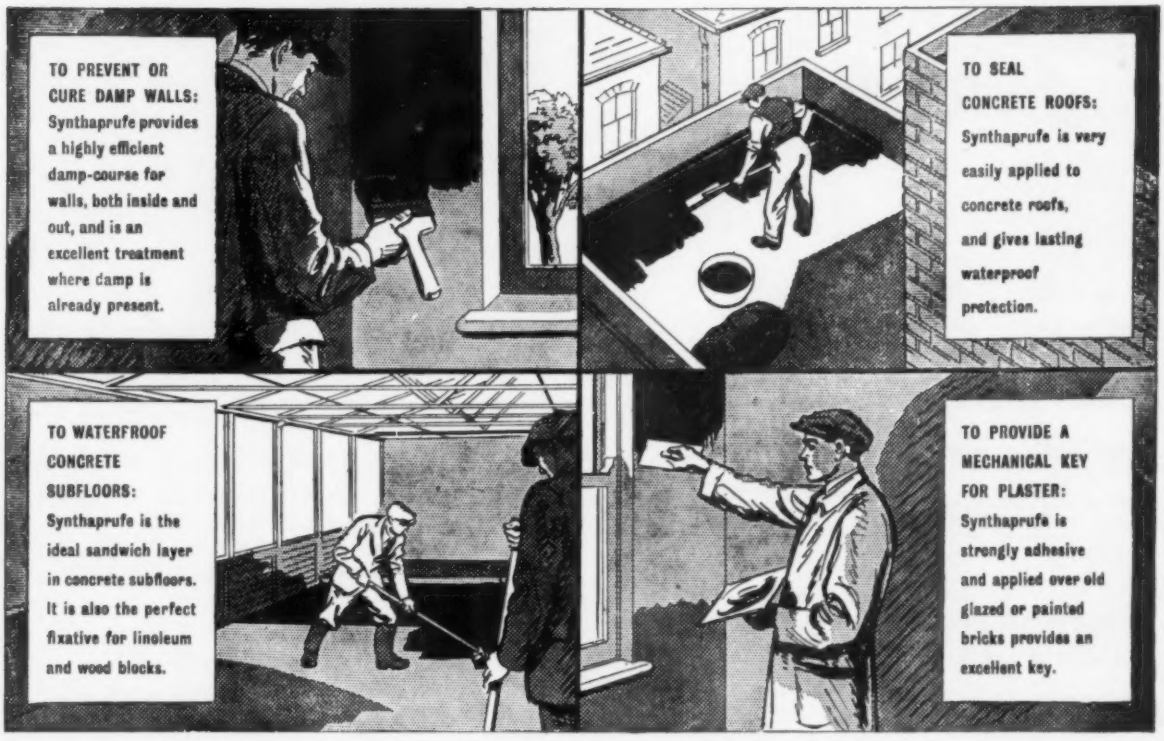
TO PREVENT OR CURE DAMP WALLS: Synthaprufe provides a highly efficient damp-course for walls, both inside and out, and is an excellent treatment where damp is already present.
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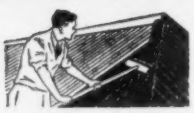

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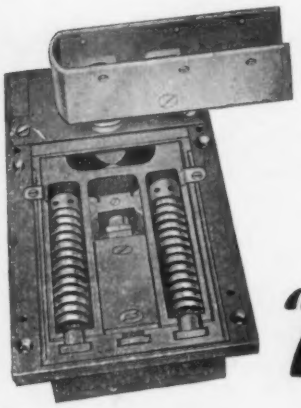

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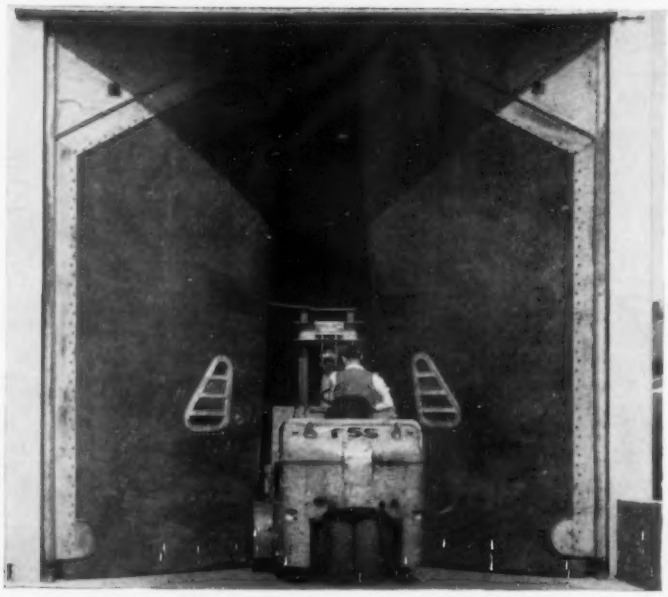

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(2) This post is in the section dealing with capital works for all Committees other than Education.

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Application forms may be obtained from L. C. Lomas, F.R.I.B.A., County Architect, 14, Castle Street, Worcester. [1997

APPOINTMENTS—contd.

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General: Potential candidates are invited to seek from the undersigned or from the Secretary of the Association of Universities of the British Commonwealth, 36 Gordon Square, London, W.C.1., a statement for the general information of candidates. Candidates in Great Britain may also borrow from the Secretary of the A.U.B.C. a coloured film showing the University and the city and surroundings of Adelaide.

Terms of Appointment: The general conditions of appointment are the same as for other Professors in the University. Details will be supplied on request to the undersigned* or to the Secretary, A.U.B.C.

Applications: Applications, in duplicate, giving particulars of age, academic qualifications, experience and war service (if any) and accompanied by a recent photograph, a medical certificate of health, a list of publications, and the names and addresses of three referees of whom confidential enquiries may be made, should reach the undersigned* not later than **FEBRUARY 15, 1956.**

Enquiries are invited and further information will be supplied on request. The University Calendar may be consulted in the Library of any University which is a member of the A.U.B.C.

*V. E. EDGELOE,
Registrar,
University of Adelaide,
Adelaide, South Australia. [1978

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CAMBRIDGESHIRE COUNTY COUNCIL

COUNTY ARCHITECT

APPLICATIONS are invited for the appointment of County Architect for the Administrative County of Cambridge. Candidates should be Chartered Architects and have had wide experience with a local authority. Salary £2,265 rising by two increments of £100 and one of £55, to £2,520.

Application forms and terms and conditions of appointment may be obtained from the undersigned to whom applications should be forwarded not later than the 18th February, 1956.

CHARLES PHYTHIAN
Clerk of the County Council

Shire Hall,
Cambridge. [1973

APPOINTMENTS—contd.

CITY OF OXFORD

CITY ARCHITECT AND PLANNING OFFICER'S DEPARTMENT

APPLICATIONS are invited for the following posts on the permanent staff:—

(A) PRINCIPAL ARCHITECTURAL ASSISTANT (To deal with all types of new building work undertaken by the three sections of the architectural group in the Department). Grade VII A.P.T. Division (£975 - £1,200 per annum).
Candidates must be members of the Royal Institute of British Architects and a Town Planning Qualification is desirable.

(B) CHIEF ARCHITECTURAL ASSISTANT (To take charge of the section dealing with public buildings and site planning). Grade VI A.P.T. Division (£880 - £1,080 per annum).
Candidates must be members of the Royal Institute of British Architects and a Town Planning Qualification is desirable.

(C) SURVEYING ASSISTANT (To deal with maintenance work and small alterations to all types of buildings). Grade: Special Classes of Officers (£690 - £840 per annum).
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Please indicate clearly for which post application is being made.

HARRY PLOWMAN
Town Clerk.

Town Hall,
Oxford. [2001

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Forms of application may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope quoting reference (G.P.S.) and completed forms must arive not later than 20th February, 1956.

S. D. ASKEW, Clerk of the Board.
Offices of the Board, New River Head, Rosebery Avenue, E.C.1. [1991

METROPOLITAN POLICE

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Apply to Chief Clerk, Chief Architect and Surveyor's Department, New Scotland Yard, S.W.1. [1930

APPOINTMENTS—contd.

CITY OF BIRMINGHAM

CITY ARCHITECT'S DEPARTMENT

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A. G. Sheppard Fidler, City Architect.
Civic Centre,
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ARCHITECTURAL APPOINTMENTS VACANT—contd.

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ASSISTANT Architect and Architectural Assistants required in City Office for work on important modern buildings. Sound knowledge of construction essential. Very good salaries paid to successful applicants.—Write or telephone, Campbell Jones and Sons, 9, Dowgate Hill, E.C.4. (Central 7748.) [1933

TAYLOR & YOUNG, Manchester require two architectural assistants interested in good class work; salary by arrangement according to experience. Apply in writing to 195, Oxford Road, Manchester 13. [1952

ARCHITECTURAL Assistants and Draughtsmen required to work in Wimbledon Office and in Central London. Commencing salary £500-£750 p.a., according to age and experience. Five-day week, pension scheme, luncheon vouchers. Telephone LIB 1189 for appointment. — The Coniston Company, Eagle House, High Street, Wimbledon, S.W.19. [1970

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COVENTRY Corporation requires Architects, APT.V (£570-900) revised scales pending. Housing accommodation may be available. Application forms etc., from Arthur Ling, Bull Yard, Coventry, returnable within 15 days of publication. [1990

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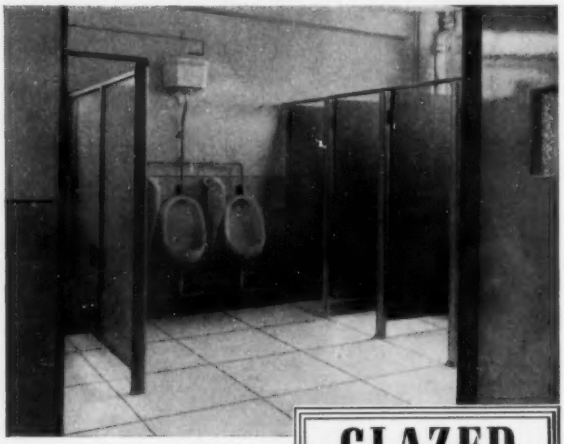

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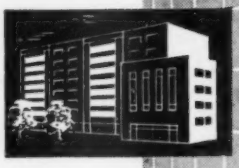

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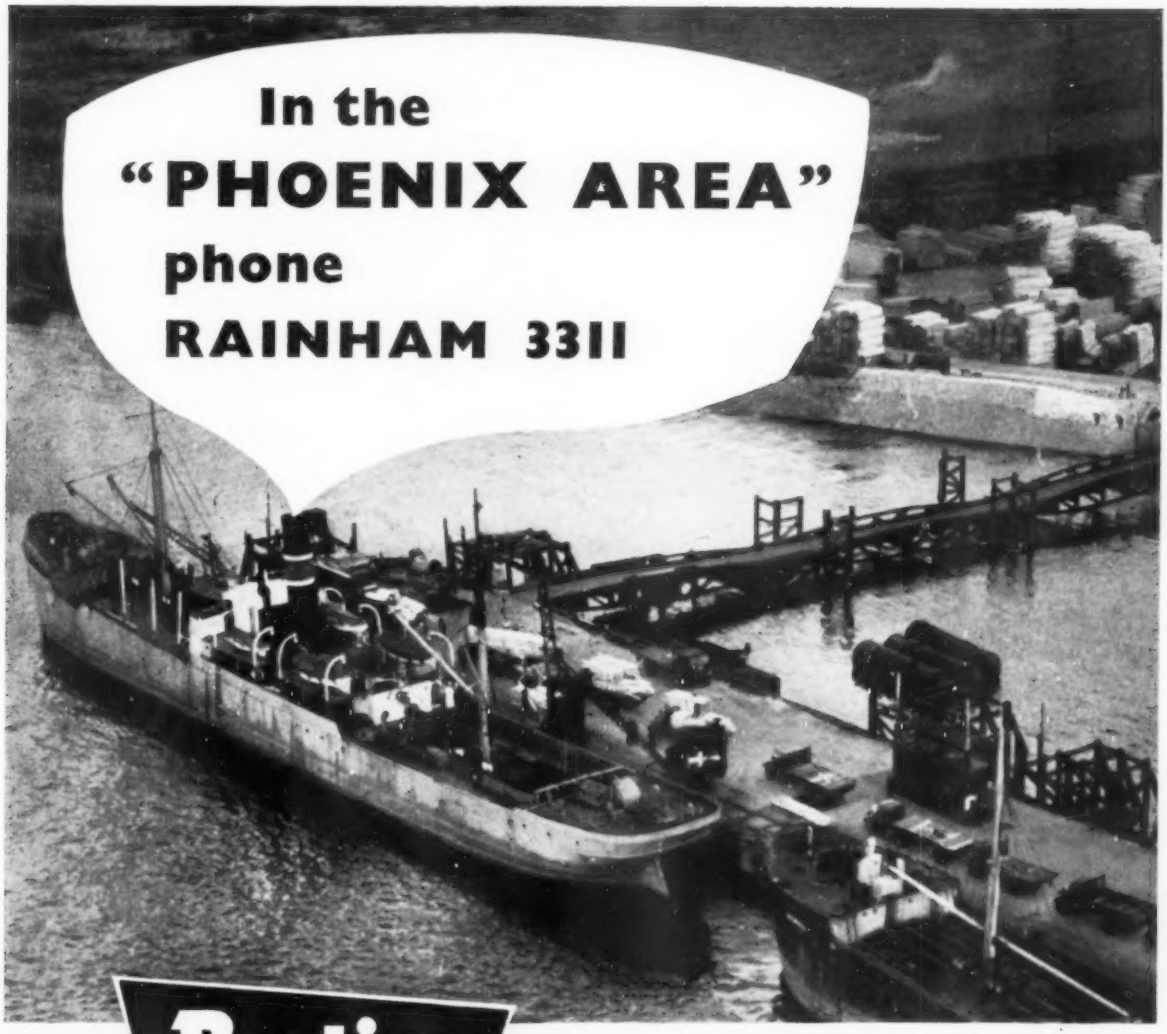

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Scheme in Progress

Picton Street Development

An interesting departure in design and construction practice characterises the London County Council scheme at Picton Street, Camberwell, for 682 dwellings in maisonettes, flats, and terrace houses. The Company was nominated as contractor at the planning stage of the project, fourteen months before commencement of work on the site, working with the architect, consulting engineer and others in a design team.

In this way knowledge of new or alternative materials, component handling, and erection techniques, was available at the time when it could most profitably be used, and together with the Company's facilities for research and development has contributed in determining the final design.

Architect to the London County Council
Dr. J. L. Martin, M.A, F.R.I.B.A.

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